



JEWELLRY
AND HOROLOGICAL REVIEW.

* Office of Publication, *

Staatliche Uhrmacherschule

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VOLUME XVII

NEW YORK, FEBRUARY, 1886.

No. 1.

THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silversmiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 42 Nassau Street, New York.

Advertising rates made known on application.

Our New Volume.

THIS ISSUE of THE CIRCULAR is the beginning of Volume Seventeen, and it also marks our entrance upon the seventeenth year of its existence. From a very small publication THE CIRCULAR has grown to its present stately proportions, ranking rather among the magazines of the period than with news or special journals. Previous to the birth of THE CIRCULAR, the jewelry trade in this country virtually had no place in the literature of industrial art; while attempts had been made to establish such a journal, they had not met with sufficient success to warrant their continuance, and after dragging out a languishing and precarious existence, they disappeared. Possibly the times were not propitious when they were brought to light, or, possibly, they lacked that indescribable something in their management that is necessary to secure recognition. At all events the field was clear for the new undertaking, and THE CIRCULAR is fairly entitled to the honor of being the pioneer journal published in the interests of the jewelry trade. As it gradually obtained recognition and its patronage increased, it underwent various changes in form and improvements in style and character; if its revenues increased year by year, so did its disbursements, for there was a determination on the part of its founders from the first to place it at the head of trade journals in this country, and to return to its patrons a full equivalent for the money they paid for its support. At the same time no effort was spared to so build up its circulation that it should be known to everyone identified with the trade, and thus the announcements of its advertisers sowed broad-

cast among those who were seeking the information they contained and would appreciate it. It was *the business* of the proprietors to cover the field as completely as possible, and to the accomplishment of this purpose no effort was spared. So successful were they, that when envious competitors appeared either East or West, there was nothing left for them to do but to glean the fields already harvested, and duplicate the work of THE CIRCULAR as far as possible. Wherever they went they found THE CIRCULAR already well known and no opportunity left for securing original business; so they were obliged to be content with such orders as the good nature of the members of the trade prompted them to give, in face of the fact that THE CIRCULAR already filled their requirements.

Just here we desire to say a word relative to competition in our business. Some of those who have undertaken to publish a jewelers' paper have evidently started out with the idea that the only possible way they could win success was to discredit THE CIRCULAR. Consequently the trade has been overrun with misrepresentations regarding ourselves, both in print and privately, and numerous attempts have been made to involve us in personal wrangles through our columns. All these we have quietly ignored, for we are thorough believers in the absolute impersonality of journalism, and do not think our readers care any more for the grievances or quarrels of editors than they do for those of strangers in the streets. As to private misrepresentations, we feel that we have been so long before the trade that our record and our adherence to business principles and the rules of fair dealing are a sufficient answer to all disparagement. So we continue on in the even tenor of our way, and quietly ignore the envious carplings of our competitors. We have never pretended to a monopoly of the field of journalism in the interests of the jewelry trade; any one who chooses has a right to enter it and do his best, but we should prefer to see all comers observe the rules of honorable competition and abstain from misrepresentation and malicious disparagement. Let every tub stand upon its own bottom is a good old adage that is always pat and applicable. At least we shall continue to maintain in the future, as we have in the past, a dignified silence regarding the attacks of others.

As to the future we have no promises to make beyond what may be contained in the statement that we shall put forth our best endeavors to maintain the envied reputation of THE CIRCULAR, and to make such improvements as time and circumstances suggest. Our columns will be filled with contributions from writers of acknowledged ability in technical matters pertaining to the great jewelry industry, with communications and comments on topics of current interest, and with such news as occurs from time to time of importance to the trade. It is our ambition to make a magazine whose monthly issue shall be, in text, illustrations and typography, a fitting and artistic representative of a great industry that is itself an exponent of all the arts. In doing this we hope to retain in the future that degree of confidence that has been reposed in us by the trade in the past.

Protect Your Goods.



WE RECENTLY saw a statement to the effect that an insurance company refused to pay for a stock of jewelry burned, on the ground that it had inserted in its policy a condition requiring the property to be kept in an iron safe which had not been done. It is scarcely probable that any court would hold such a condition to be valid, for insurance is intended to cover the risks to which property is subjected in its ordinary and accustomed use; if it is to be kept in fire proof safes all the time there is no risk. However unlawful such an insurance policy may be, the fact that the non-compliance with such conditions may subject one to trouble and litigation as well as to the loss of the property, constitutes an additional reason why owners of valuable goods should take every precaution to protect and preserve them. But it is not only against fire that protection is needed; the jewelry trade encounters more losses through thieves and burglars than it does through fire. It is natural that this should be so, for while the goods it handles are not especially inflammable or liable to spontaneous combustion, they are particularly tempting to the criminal classes, who will spare no labor to get possession of them. The losses of the trade through robbery amount to an enormous sum in the aggregate every year. If this amount was divided up *pro rata* among all members of the trade, it would make such a tax upon each individual that they would soon devise means for obtaining relief from it. But as it is not, it falls with all the greater severity upon the few who are robbed, and have to bear the burden themselves.

No dealer has the right to neglect to provide the necessary safeguards for the protection of his goods. His duty to himself, his family and his creditors demands that he shall use every precaution prudence can suggest to prevent their being destroyed by fire or carried off by robbers. Of the two evils, their destruction by fire is the least objectionable, for in that case the loss usually falls upon the insurance companies instead of the dealer and his creditors. But robbery has been reduced to so much of a system by experts in the business, that when once access is gained to a stock of jewelry the ordinary dealer has little hope of recovering his property. The goods are rapidly transferred by the thieves to some accommodating receiver, usually in a distant city, where they are so defaced and transformed as to be beyond recognition. The expense attending a vigorous following up of the thieves is so great that dealers are often deterred from making any effort for the recovery of stolen goods, and so the thieves are permitted to escape with their plunder. As a means of aiding dealers in protecting their goods, and in recovering such as may be stolen in spite of all precautions, the Jewelers' Security Alliance was organized in this city some years ago. It has already done valuable work in prosecuting robbers and recovering goods, and is now organized even more effectively than ever before. The purpose of the Alliance is to aid its members in prosecuting thieves and recovering stolen goods. To this end it has arranged with Pinkerton's detective bureau so that expert detectives are at its command in every section of the country to investigate any robbery of any member. The Alliance assumes all the expenses incident to the prosecution of the thieves; their conviction is the main point to be gained, so that punishment visited upon them may serve to deter others from attempting similar crimes. So many culprits have been followed up and landed in State prison by the Alliance, that the name of that organization is a terror to all thieves. A certificate of membership conspicuously displayed in the store of a dealer is far better protection than an ordinary watchman, for when thieves in their prospecting tours see this, they understand that if they rob the premises they will be relentlessly pursued by the best organized corps of detectives in this country. It has been repeatedly demonstrated that an Alliance certificate has prevented burglars from carrying out their plans of robbery when locks and bolts would have been treated with contempt. The losses by robbery of members of the Alliance have fallen off very materially since they have sent so

many thieves to State prison, and this fact tends to increase the danger to those who are not members. Thieves fully realize that a jewelry store always contains valuable plunder, and if an Alliance certificate prevents their robbing one place they seek for another that is not so protected. While this organization continues to do such important work no dealer can afford to be without its certificate. One of the conditions of credit very generally insisted upon in all commercial transactions is that the goods shall be kept fully insured while in the custody of the debtor; it ought to be a further condition in the jewelry trade that the debtor shall be a member of the Security Alliance and entitled to the protection it affords.

A National Bankruptcy Law and the Failures of 1885.



UP TO THE present writing Congress has taken no decisive action upon the question of a national bankruptcy law. It seems scarcely probable that it will ignore the almost unanimous voice of the business community, uttered regardless of locality, in favor of such a law, but the ways of Congress are inscrutable. If there were in the proposition an opportunity for any party or any faction to make political capital out of the measure, it would have been brought prominently forward long ago, but as it is only one of commercial importance, affecting business, not political interests, it is not regarded as of much account by the average member of Congress. As indicating how vital the subject is to business men, we make use of some statistics regarding the failures of 1885 as published by Bradstreet. At the close of the third quarter the indications were that the total number of failures for the year would be below the total of 1884, which was borne out by the reports of the fourth quarter. The report for the year by sectional divisions is as follows:

BUSINESS FAILURES FOR 1885.

| States. | No. of failures. | Actual assets. | Liabilities. |
|---------------------------|------------------|----------------|---------------|
| Eastern..... | 1,442 | \$5,494,139 | \$14,500,091 |
| Middle..... | 2,416 | 17,183,038 | 38,711,593 |
| Southern..... | 2,191 | 11,111,962 | 24,119,894 |
| Pacific..... | 960 | 3,743,876 | 7,256,701 |
| Western..... | 3,824 | 16,573,423 | 32,597,454 |
| Territories..... | 283 | 1,158,664 | 1,934,937 |
| Total United States..... | 11,116 | \$55,265,102 | \$119,120,700 |
| Canada and provinces..... | 1,286 | 4,201,831 | 9,210,334 |
| New York City..... | 372 | 6,620,026 | 16,122,545 |

In 1884 the number of failures was 11,620, the liabilities \$248,740,000, and the assets \$134,620,000. In 1879 the liabilities of all bankrupts was less than \$100,000,000, in which year the assets were equal to 49 per cent. of the liabilities. Since that year the breach between assets and liabilities has been gradually widening; in 1880 the assets were 48 per cent.; in 1881 47 per cent.; in 1884 there was an improvement, the assets being 54 per cent. of liabilities, while last year they fell off again to 46 per cent., or three per cent. less than in 1879. In two years the liabilities of bankrupts amounted to nearly \$400,000,000, only about 50 per cent. of which was secured by tangible assets. Or, in other words, here is an annual loss of about \$100,000,000 through the insolvency of persons who have enjoyed the benefits of our credit system. This is as though the creditor class had thrown \$100,000,000 a year into the ocean or into a modern patent crematory. It is that much capital wasted. The immense sums involved in these failures all over the country are altogether too important a factor in our commercial transactions to be lightly considered; they mark the dividing line between prosperity and hard times, between profit and loss. How often we hear the statement made by a business man: "I should have had a good year but for bad debts." After putting his capital, his labor, his brains and his energies into the prosecution of his business for a year, he finds at its close that he is no better off than he was at the beginning, simply because many of his customers found it more convenient or more profitable to fail than to pay their honest debts. This would not be

so bad of itself if the creditor could get his goods back, but, as shown by the above record, when the insolvent's estate is settled up, it is found that there has been an immense shrinkage of assets in some way; that not only has the capital the insolvent had in the business swallowed up, but the goods for which his liabilities were to a great extent incurred have disappeared in some mysterious manner. There is something savoring of magic in this sudden wiping out of assets; instances have been known where dealers have bought thousands of dollars worth of goods one week, and when the next brought their failure, they can only offer twenty or twenty-five per cent. in settlement of claims scarcely a week old. In such cases there is *prima facie* evidence of fraud, but, in the language of that illustrious statesman and defunct financier, "What are you going to do about it?" To attempt to prosecute the bankrupt in a city a thousand miles away, where State laws are made for the protection of resident debtors against the claims of alien creditors, is simply to throw good money after bad. This the jewelry trade has found out by sad experience, and, as a consequence, creditors have fallen into the habit of accepting such a percentage of their claims as the liberality of their insolvent debtors prompts them to offer. Three or four failures judiciously compromised have been known to leave an insolvent well fixed in worldly possessions and independent of all business cares and anxieties. To revolutionize these methods and to secure justice alike to the creditor and debtor classes, a national bankruptcy law is necessary. Uniformity of legal proceedings in winding up an insolvent's estate is the great point to be gained. The law as it exists where the credit is given, should be identical with the law prevailing where the debt is to be collected, especially when the debtor has declared himself to be incapable of managing his own affairs, and has had to appeal to the courts for assistance and protection.

The creditor class expects to take many risks; the hazards of business are numerous enough when integrity sits at the helm; all these creditors are prepared to accept, and will never complain when honest losses occur; but when integrity is thrown overboard and fraud takes command, honest creditors have little chance of obtaining their dues. It is to prevent fraud and secure uniformity of treatment of insolvent estates that a national bankruptcy law is required. The business men of the country have appealed to Congress year after year for relief; a bill has been presented that has received the unanimous approval of nearly every board of trade and commercial exchange in the land; committees have been appointed to urge Congress to pass this bill, yet that body hesitates, delays and fails to act. Members of Congress have of late come to greatly misunderstand their position; instead of recognizing the fact that they are the servants of the people, they assume the lordly airs of masters, and treat their constituents with the utmost contempt. It would be a good thing if these constituents would make an example of some of them for their position relative to this bankruptcy bill, and give them to understand that if they persist in ignoring the wants of the business community they will be left at home when the next elections come around. A gentle hint to this effect conveyed to a few anxious members might serve to quicken their action somewhat. This bill is of vital importance to all business interests, and no effort should be spared to secure its early passage.

"Bummers" in Trade.



IT IS A reproach to the civilization of the age that certain practices that are not only demoralizing in their tendencies, but positively immoral and corrupting in their influences, are, if not wholly approved, at least tolerated and suffered to pass without rebuke. A forcible illustration of this is furnished by the telegraphic report of the case of Vernon G. Clark, whose arrest in Philadelphia

charged with robbing his employers in Chicago we chronicled in our issue of last month. When brought before the court Clark pleaded guilty. We quote the telegraphic report:

A member of the firm said that his firm was in a measure to blame for the conduct of the prisoner, and he would therefore ask the clemency of the court in his behalf. He said that it was a custom among many firms in the city to entertain country buyers when they came to the city. Clark had done this and the witness thought the prisoner had been led astray by so doing.

"A pernicious practice," said the judge, "and it ought to be stopped."

"Other firms do it," said the witness.

"I don't care if they do, it is a bad practice."

It was shown that Clark had acquired gambling habits in guiding customers of the firm about town. The prisoner had a wife and two small children dependent upon him. The court sentenced Clark to two years in the penitentiary and suspended the sentence; but the State's Attorney agreeing to a plea of petty larceny, the sentence was changed to thirty days in jail.

This practice of employing "bummers" to hang around hotels and make the acquaintance of buyers, and to extend to them all sorts of questionable "hospitality," is by no means confined to any city or to the jewelry trade. These men are employed to visit the hotels daily, to introduce themselves to buyers temporarily in the city, to take them to theatres, to dine and wine them, and, if they are so inclined, to accompany them to resorts of questionable repute; in short, to show them "the sights" of a great city, and finally, when they get ready to make their purchases, to pilot them to the establishment the "bummer" represents. All the cost of this questionable "entertainment" is borne by the firm employing the "bummer," and it is not at all surprising that he finally becomes corrupted in his moral nature and turns embezzler and thief. We have known of two instances where college graduates have become candidates for the penitentiary as a result of such employment—one was in the dry goods trade and the other was employed by a clothing house. Maiden Lane could point to a goodly number of promising young men who have been ruined by habits acquired while dispensing the so-called "hospitalities" of the firms they represented. We believe in sociability and hospitality among business men, but the employment of young men as "bummers" in the manner indicated, is an offence against morality that can neither be excused nor condoned. It is deliberately placing temptation before men and paying a premium to those who yield to it. The case of young Clark is not an isolated one by any means, but is remarkable from the fact that his employers admitted that they were largely to blame in having tempted him. The humane judge took this view of the case, and made the sentence as light as possible. The wonder is that he should, under the circumstances, have been prosecuted at all.

This practice of "bumming" for trade is wholly unnecessary, and, we are informed by old members of the trade, seldom profitable. It may serve sometimes to catch a temporary customer, but whether buyers of such a convivial nature prove profitable in the long run is questionable. Commercial agencies usually consider convivial habits as derogatory to the character of a debtor, and it is a mystery why creditors should tempt their patrons to indulge in practices that, as business men, they are in the habit of regarding as prejudicial to their standing. They, in fact, hire "bummers" to persuade buyers to do those very things which, reported by a commercial agency, would lead them to refuse them credit. It is safe to say that a large majority of buyers visiting the large cities feel insulted by the "bummer's" attentions, and the few to whom they are agreeable, the hail-fellow-well-met class, give credit to the "bummer" for his convivial qualities and not to the firm that pays the bill. But, entirely independent of the question as to whether or not "bumming" for customers pays, comes the more important one as to the moral responsibility of those who encourage it, and the most callous employer who ever paid a wine bill incurred by his employee in the manner indicated, cannot but feel a prick of conscience at his culpability in this respect. Let any man in the trade run over the list of the young men he has known who have been ruined by their convivial habits, and he will be startled to see what a load of responsibility rests with those who have encouraged them in their downward

path. The first of the year is the accustomed time for putting into effect good resolutions for the future, and among those employers might adopt with advantage to themselves, their employees and the general community, is one to forever discourage the practice of "bumming" for business. Let them say to all their salesmen: "Hereafter we will pay no bills for hospitalities under any guise," and such offences against good taste and public morality will soon cease.

Business Prospects and Abuses of Credit.

IF CONGRESS does nothing to destroy public confidence in the resources and ability of the country, the year just entered upon bids fair to be one of the most prosperous that has been experienced in the past decade. The holiday trade furnished abundant evidence that there is plenty of money in the hands of the people, and that all that is necessary to put it into circulation is confidence in the future. The last quarter of the past year showed considerable improvement in general business over the preceding months, and, as a consequence, there was a tendency toward liberal expenditures during the holiday season. The average man felt that under the promise of a better business year, he could afford to spend a dollar where half that amount had been made to suffice the year before, and the result was that the holiday sales in all lines of goods were all that could reasonably have been expected. In the jewelry trade everybody was kept busy, and the aggregate of holiday sales aided materially in swelling the volume of the year's business. We made it a point to inquire of numerous jobbers regarding the state of trade at the close of the year, and in every instance were informed that the holiday trade had been excellent, and that the aggregate sales for the year were considerably in excess of those of 1884. In several instances manufacturers noted for their holiday novelties, informed us a week before Christmas that their stocks had run out, and at that time they were unable to fill all the orders they had received. The retail stores were thronged as they have not been before in several years, and an extra force of salesmen was required in many stores to wait upon customers. Never before were goods sold with such a narrow margin of profit; competition and hard times combined have brought down prices to a point that little more than compensates the manufacturer for his outlay, while dealers are content with a profit that would have seemed ridiculous a few years ago. But the main object of manufacturers and dealers for the past few years seems to have been to do business regardless of profit, for the sole purpose of keeping their employees at work and thereby furnishing them the means of living. Those who have their capital invested in the business have been getting but sorry returns for it, but have been holding on in the hopes that times would improve. Should the promise of the holiday season be fulfilled, there is hope that they will secure during the present year at least a portion of the reward due to their patience and forbearance.

The jewelry trade is a heavy loser every year from bad debts. Under the prevailing custom of giving credit promiscuously to almost everyone who asks it, numerous losses through insolvent debtors are inevitable. In no other line of business is there such a willingness to take chances manifested. There is such a craving for four months' notes that jobbers are willing to exchange goods of actual positive value for them, when, as too often proves to be the case, they are scarcely worth the paper they are written on. If bad debts could be transformed into good collectable assets, there would be a marked improvement in the character of the jewelry business. There are some jobbers of a conservative turn of mind who have taken a decided stand upon the credit question, and will only give accommodation to those who, after careful investigation, are found to be

deserving of it, whose business standing and personal character are such as to reduce the "moral hazard" of the transaction to the minimum. It makes no difference to these conservative men what their neighbors do in this respect, and the fact that they sell their goods at hap-hazard to Tom, Dick and Harry, does not influence them in the least, and the old statement that "If I don't sell them some one else will," is lost upon them; they hold that credit is too great a boon to be abused, and that it is their duty to protect themselves. No doubt these "old foggy" conservatives lose some sales, but as a compensation, they have a smaller sum to charge up to the account of profit and loss at the close of the year. Some of those dealers who claim large sales, and are a little given to boasting over their successes, find when the day of settlement comes that their bad debts have increased out of proportion to their receipts, and that it would have been more profitable to them to have sold fewer goods to responsible buyers than to have taken such reckless chances with Tom, Dick and Harry. There is probably little prospect for any combined effort to reform the credit system in the jewelry trade, but if each dealer would resolve for himself that he will not part company with goods possessing actual cash value for commercial paper issued by men of questionable solvency, the reform will accomplish itself. If in this process of reformation a goodly number of dealers are induced or compelled to go out of the business it will be better for the trade in general, having a tendency to restrict competition, and thereby enable the legitimate and responsible dealers to obtain a reasonable profit on their goods. There is many a dealer in the country who is now bolstered up entirely by his creditors, who would be better employed working at the bench or holding a plough at the tails of a yoke of steers. Operating without capital and without business training, and having everything to gain and nothing to lose, they are a constant thorn in the side of the dollar-for-dollar dealers, because of their reckless disregard of business rules and their utter indifference to insolvency proceedings. If this class of dealers could be weeded out entirely it would be an act of mercy to them and a benefit to every other branch of the business.

Arbitration the Remedy for Labor Grievance.

IN THE January issue of THE CIRCULAR we indulged in some remarks on the subject of labor strikes, the occasion therefor being the strike and "boycotting" measures adopted by the employees of the Derby Silver Plate Company. We took the ground that the grievances of employees would receive more attention and be more likely to be redressed if submitted to arbitration, than if violent measures were adopted to force employers to listen to them. Since our issue of last month several important labor demonstrations have been amicably arranged by arbitration, thus fully sustaining the views we expressed. The first of these was the difficulty among the shoemakers of Lynn and other places in New England. This great industry is divided into separate and distinct branches, each branch having its trade union and rules and regulations for its government, but trouble in one department usually spreads till all are involved. Such was the case in this instance. The lasters had certain grievances which they demanded should be redressed and a strike was ordered. This would require that the strikers be sustained by all persons employed in making shoes, and after one or two demonstrations had been made, the workmen appointed a committee to meet a committee of manufacturers to arrange their differences by arbitration. The consultation lasted two or three weeks, but in the end an arrangement was arrived at satisfactory to all concerned, and covering every branch of the industry. At one time the attitude of the workmen was so hostile and so formidable that some of the employers

were making arrangements to remove their business from the State. The second labor outbreak that has been settled recently was that of the coal miners in Pennsylvania. For ten months hundreds, if not thousands, of coal miners have been on a strike for an increase of wages, that not only their employers, but also all coal producers declared to be unreasonable. At the beginning of the trouble arbitrators were called in, but the miners refused to abide by their decision and continued the strike. Much lawlessness followed, the strikers not only refusing to work themselves but to permit any one else to take their places. Finally, after ten months of idleness and rioting, the strikers have gone to work on the very terms proposed by the committee of arbitration at the outset. As a result of this strike, the miners lost hundreds of thousands of dollars that would have been paid to them in wages, have run into debt and have suffered hunger and privation, imposing like suffering upon their families. A third labor difficulty that threatened serious consequences to the residents of New York, occurred among the engineers of the elevated railroads. Their principal demand was that they should not be required to work more than eight hours a day without extra pay. The company refused the demand and a strike was imminent, the danger being aggravated by the company closing two lines of road. From this unlawful position they were obliged to recede through the interference of the State Railroad Commissioner. Mr. Arthur, the chief officer of the Brotherhood of Engineers, was summoned here, and by his tact, intelligence and forbearance, a strike was averted. At the head of a committee of engineers he demanded a conference with the officers of the company, and this being conceded and mutual concessions made, an agreement was entered into satisfactory to all concerned. Nine hours a day constitute a day's work, and some other advantages are gained by the engineers. This great corporation that has been able to control legislatures, courts, city officials and others, was obliged to yield to the organized demands of labor, and to concede to its employees a just and fair recognition of their services. The engineers gained by peaceful arbitration more than they could by a strike that would have cost many of them their places and precipitated a long and disastrous struggle. Other lesser difficulties between employees and employers have recently been settled by arbitration, and there is good reason to hope that in the future we shall see fewer violent labor demonstrations than we have in the past.

These instances of what may be accomplished by peaceful endeavors to harmonize the relations that must exist between labor and capital, should be taken to heart by all persons interested in any way in industrial enterprises. There are always two sides to every question that may arise between employer and employed, and the sensible way to adjust the differences is for all parties in interest to discuss them frankly, openly and dispassionately. There are many thousands of persons employed in the jewelry business; they are usually workmen of more than average intelligence, but prone to adopt the unyielding prejudices of the wage-earning classes. It is too much the practice of working men to regard their employers as oppressors, and to feel that they are inadequately compensated for their labor, while the employer, who invests his capital in business, takes all the responsibility and all the risk, is equally confident that his profits are too small. The workman says: "I am a skilled workman and know the value of my labor." That may be true, and yet he may not appreciate what it costs his employer to turn that skill and that labor into cash. The employer knows the commercial value of the products of his factory, and, consequently, the commercial value of the labor expending in making those products, and it is only by a mutual understanding of all the factors that go to make up commercial transactions, that the relations between employer and employed can be maintained on a satisfactory basis. Skilled labor is valueless unless there is a market for it, and there can be no market unless capital can profit by utilizing it. Arbitration is the practical and most effectual method of establishing proper relations between capital and labor.

The History of Goldsmithing.

Continued from page 388.



ANY OTHER members of the English aristocracy still own very nice specimens of the goldsmithing of the 17th and 18th centuries. From among those of a very superior style we will mention three ladies' toilet sets; the first, of fourteen pieces, decorated with scroll work and mythological figures, belonging to Sir W. C. Trevelyan, and bearing date 1681; the second set, wrought about twenty years afterward, is owned by the Duke of Richmond, and the third, made about the same year for Lady Caroline Daneth, is in the possession of Mr. Stafford.

As we said in a previous chapter, the majority of the specimens of these centuries are in the possession of the wealthy municipal and industrial corporations, the city of Norwich being one of the richest. Bristol, Bath, Doncaster, equally pride themselves on their treasury vaults, while the trades organizations of a number of cities, those of London especially, can successfully compete with them.

Were we called on to express our opinion on these hoarded treasures we would be constrained to say, that as riches, as representatives of wealth, they are everything, but as objects of art, they are nothing. English goldsmithing during the entire 17th, and almost up to the end of the 18th, century, possesses only one incontestible quality: it is solid, it represents value; the material has not been stinted in its construction. But of style, of taste, there is not a trace. We have a Louis XIV. without grandeur, or a Louis XV. without spirit and originality. The first attempt toward a return to the conformation of style becomes manifest only at a later period, and even then but imperfectly, under the ultra-classic influence of the sculptor Flaxmann.

Among the list of English goldsmiths of the last century, who enjoyed a fair share of renown, we may mention the following:

Sir Francis Child. We derive the following authentic information from the inscription on his tomb: "Sir Francis Child, Knight and Alderman, and President of Christ's Church Hospital in London, who departed this life October the 4th, 1713, ætatis 71. He was Sheriff 1690, and Lord Mayor in the year 1699, and in the year 1702 he was chosen one of the four citizens to serve for the said city in the first Parliament of the reign of Queen Anne, etc." He had twelve sons, who succeeded him as goldsmiths.

The name of Sarah, the celebrated Duchess of Marlborough, the friend of Queen Anne, must ever be remembered with reference to Child's bank. On one occasion when a rumor was afloat that a run was about to be made, she collected as much gold as she could and brought it down herself to the bank at Temple Bar on the very morning the run was to be made, thus enabling the firm to meet all demands.

The family of Child being a remarkable one, the spirit of story-telling has seized on us, and before returning to the "History of Goldsmithing," we will recount an anecdote concerning one of its members. In 1763, the last son died, and the family pursuit of goldsmithing descended to the younger line, the firm then being "Robert Child & Co.," of whom a romantic story is told. Lord Westmorland, rich in name, but poor in purse, fell in love with the daughter of this wealthy goldsmith, but knowing that he would be unsuccessful in his suit, he made use of the following subterfuge: He was dining with the goldsmith one afternoon, and among other topics upon which they conversed the lord said, "Child, I wish for your opinion on the following case: Suppose that you were in love with a girl, and her father refused his consent to the union, what should you do?" "Why! run away with her, to be sure," was Mr. Child's prompt reply, little thinking at the time that it was his daughter the querist was in love with. That night, or a few days after, Lord Westmorland eloped with Miss Sarah Child in a post-chaise and four, northward. Mr. Child promptly gave chase in a similar conveyance, and was on the point of overtaking the runaways, when Lord West-

morland, leaning out of the window, shot one of the leaders, which overturned the carriage and caused a delay, giving the pair time to reach Gretna, and be married without further hindrance. During the short interval between the runaway marriage and his death in 1782, Mr. Child never forgave Lord and Lady Westmorland, and dying in the course of the same year, he left the whole of his immense fortune to the first daughter of the union.

The next is one Henry Jerningham, who died in 1761. The project of building a new bridge at Westminster was set on foot in the year 1734. The finances were to be obtained by means of a lottery, for which an Act of Parliament was passed authorizing the raising of a fund, from which amount, after paying the prizes, it was estimated there would be a residue of £100,000 for the new work. In connection with this lottery a curious incident may be mentioned. On the 2d March, 1735, while the bill was in progress, Henry Jerningham, goldsmith, petitioned the House, stating that he had made a silver cistern that had been acknowledged, by all persons of skill who had seen the same, to excel whatever of the kind had been attempted in this kingdom; that, after an expense of several thousand pounds on the workmanship alone, exclusive of the weight in silver, and after great hazards in the furnace, and four years of application to the raising and adorning the model, the cistern now remained on his hands.

The House not only thought the proposition reasonable, but actually voted an instruction to the committee on the bill to make provision in it for the petitioner, by directing the disposal of the cistern by lottery.

These massive cisterns were in fashion in noble families toward the end of the 17th and beginning of the 18th centuries. One in the Duke of Rutland's possession weighs 2,000 ounces. Another, six feet high, together with its fountain, belonging to the Earl of Chesterfield, weighs 3,546 ounces. Most of these cisterns were melted down subsequently, to be re-made into dinner services or more useful pieces of plate.

Perhaps one of the best of the English goldsmiths was Paul de Lamerie, who died at an advanced age in 1751. This celebrated silversmith, whose name is so well known to collectors, and whose works are still so highly appreciated, was greatly patronized by the nobility and gentry as the first silversmith of his time; and there is no doubt that he was an artist and designer as well as a plate worker.

He was French by birth, and probably learned his art in France, which he doubtless quitted toward the end of the reign of Louis XIV., when the art had declined to such an extent that goldsmiths were compelled to find employment in other countries, the "Grand Monarque," in order to pay the expenses of his wars, having sent his plate to the mint, in 1668, to be melted.

We will mention one more: Nicholas Sprimont, of Compton street, Soho, whose name we find entered at Goldsmiths' Hall as plate worker, in January, 1742. He carried the modeling of shells, corals, insects, shell fish, and rock work to great perfection in silver. A specimen of his plate, viz.: a pair of oval dishes 11 inches in diameter by 9 inches, beautifully modeled in this manner, made in 1743, is preserved in the Royal Collection at Windsor. The same character of work was modeled by his contemporary, Paul Crespin. Sprimont is also celebrated as being the founder of the Chelsea porcelain factory in 1750, under the patronage of the Duke of Cumberland and Sir Edward Fawkener, of which, in 1755, he became sole proprietor. The same taste was carried out by him in porcelain in the well known center pieces of Chelsea china of the early period of its existence. He styles himself "undertaker of the Chelsea manufacture of porcelain, a silversmith by profession, in which one hundred persons are employed, and a nursery of thirty lads from the parishes and charity schools, who are bred to designing and painting."

Germany adhered to the new order of the Renaissance longer than England, and pieces of goldsmithing belonging to the 17th and 18th centuries, of a great purity of form and richness of decoration, are frequently to be met with, particularly in Bavaria,

The more important, perhaps, is the altar-leaf of the so-called Rich Chapel, in the old palace of Munich. This altar, entirely of ebony, is decorated with thirty-two bas-reliefs of silver, representing the history of the Passion. The center piece, about one yard in length, portrays the scene of the crucifixion. A group of figures stands upon the altar plate, the principal part of which are the figure of Christ, those of the twelve apostles, statuettes about one foot high, and twelve angels carrying flambeaux. This work was finished in 1607, and is attributed to the goldsmiths of Augsburg.

The Rich Chapel also possesses a magnificent gold chalice of the seventeenth century, bearing the coat-of-arms of the Elector Palatine, Maximilian I., Duke of Bavaria, which therefore must have been manufactured between the years 1623 and 1651. There is, perhaps, nothing belonging to this epoch of a purer taste or more exquisitely worked. The ornamentation, entirely plane, consists of figures, wreaths and arabesques of enamel, either opaque or semi-translucent, of a great richness of color.

The Album of the Industrial Arts, published by M. Labarte, contains the sketches of two other charming pieces of German goldsmithing—one, a cup bearing the arms of the Prince Janussius Radziwill (1621), and the other, a very elegant knife with the name of Anna Roeloffs (doubtless the person who ordered it made).

Unhappily, this laudable adherence to the conformations of the Renaissance did not last long. Germany, also, permitted itself to be dragged into the current of bad taste which engulfed all Europe. Quite a number of specimens of German goldsmithing are still to be seen in the collection of amateurs; but after we pass the first half of the 17th century, we do not know of a single piece deserving of mention.

This cannot be said of the goldsmithing of the Netherlands, which we see in a fairly flourishing state in the 17th and 18th centuries. The Low Countries had at this epoch become imbued with the tastes of the Flemish goldsmiths, and their productions are still plentifully found in the collections, both public and private.

The first name of a Dutch goldsmith which we encounter at the commencement of the 17th century is that of Johann van Merlin, who lived in 1600, as well as another one, the celebrated Paul van Vianen, of Utrecht. Prince Frederic of the Netherlands owns a very handsome gold cup chased by the latter, who joined to his name the title of "Goldsmith of the Holy Catholic Empire." The principal object of this cup is Diana surprised in the bath by Acteon; upon the lid are seen the figures of Bacchus, Ceres and Love. The collection of the Duke of Hamilton, of England, also contains three other pieces signed by Paul de Vianen, to wit, the triumph of Pluto and Prosperine, dated 1621; a wine goblet in *repoussé*, bearing a figure of Bacchus, with cup in hand, between a barrel and goat; and a love token, ornamented with a figure of love, surrounded by dolphins. These three pieces, of silver-gilt, belong to the first third of the 17th century.

About the same time flourished another very skillful goldsmith, D. Zyde. The city vault of Amsterdam prides itself on possessing the brass foot of a goblet made by him; it is formed of small figures, which, by an ingenious mechanism, approach toward or remove from each other, according to the capacity of the vase to be supported thereon.

The Archeological Society of Amsterdam also owns a goodly number of pieces of goldsmithing of the last two centuries, some of them interesting as works of art, others as historical souvenirs. A handsome silver goblet, wrought in 1678, by Jean Kuynder, for the little town of Swartslouis, in Overgell, can lay claim to the above two qualifications. Upon this goblet are seen the portraits of the donors, the figures of Peace, of War and of Justice, each with different inscribed mottoes, and the singular following inscription: "A l'hotel de ville de Swartslouis, on trouve à son honneur ce chef d'œuvre pour y boire le vin, lorsqu'il est permis de se rejuvenir." ("At the town hall of Swartslouis one finds to his honor this chef d'œuvre, to drink wine there, when he is permitted to make merry.")

Russia, seeing the advances of the countries surrounding it, could not but be stimulated into new life and activity, and it joined the ranks of the advancing European nations. All its industries, more especially goldsmithing, soon attained to a high state of development. It must be stated, however, that for it there was no Renaissance of style or workmanship; it kept separate under the double influence of its origin and the traditions of the dominant religion, and Russian style has, up to the present, preserved a certain unexpressed but perceptible inclination toward the Byzantine. Its products are but little known outside of its own country, and travelers have only lately attempted to describe and portray its principal chefs d'œuvres. To understand the works by its able masters fully, they must be studied in the rich treasure vaults of its churches. We desist from describing the masterpieces, having lately been very ably treated by John W. Miles in the pages of THE JEWELERS' CIRCULAR.

Our review, finally, brings us back to the mother of all art—Italy, and before beginning with the closing chapter of our history of goldsmithing, we will throw a hasty glance at its goldsmithing during the 17th and 18th centuries. We once admired the noble proportions to which it had attained in the 14th and 15th centuries, but witnessed its decline in the second half of the 16th, and now we find that during the course of the following century, this decline becomes more pronounced under the pernicious influence of Chevalier Bernin, whose omnipotence in matters of art, it is well known, was nearly as great in Italy as that of Lebrun at the court of France. It became worse in the 18th century. The mannerism of the Italian workman was not even relieved by the piquant grace of the school of Boucher and Watteau, of France. Owing to this, the Italian pieces of workmanship of this period are not much sought after by antiquarians, although the Duke of Hamilton has gathered a few of the most noteworthy, among others, a water pitcher and a large salver made for the last of the Stuarts, the Cardinal of York, who, as is well known, passed the greater portion of his long life in Italy. The two pieces were made by an Italian goldsmith, at that time very renowned. But do we stand at the ruins of the bold conceptions rendered illustrious by the Orcognas, the Ghibertis and the Pollajuolos?

(To be Continued.)

Sight.

What the Optician Should Know About the Eye.

[BY DR. C. A. BUCKLIN, NEW YORK.]

NEVADA, Iowa, Nov. 13, 1885.

Dear Sir—I have a customer that is very difficult to fit with glasses, a young lady about 24 years of age, and in her ordinary work her eyes seem to be perfectly straight, but in reading fine print or looking at something that it is difficult to see, she turns one eye in so much that is very cross-eyed with that eye, and does not see with it when it being out of focus, but it becomes straight again as soon as she takes her eyes from close seeing. She has been so from a little girl. A strong convex lens helps her, and then she does not look cross-eyed, but I think I ought to combine a convex with a prism, and want to know if such a combination would give any ill effects. Please refer this to your optician as I would like to know in regard to it.

The person in question should wear the *very strongest* convex lenses with which it is possible for her to see distinctly at a distance. I do not think she will require any kind of a prism; simply set the lenses properly. If in spectacles do not have the distance between pupils greater than $2\frac{1}{4}$ inches. If you use eye-glasses, the distance between pupils will be sufficiently correct providing the lenses are not badly centered.

She should wear these lenses continually. They will be of great practical service to her.

You need not be surprised if she accepts lenses as twelve or nine.

The case is a simple case of (squin) strabismus, as the result of a high degree of hyperopia. The first case I ever treated in private practice was the only daughter of a busy practitioner of medicine. She had a squint which I succeeded in curing by the use of convex twelve lenses.

The specialists who had attempted to treat her by the use of glasses had failed and given the case up, simply because they did not recognize the high degree of far-sight. She would not accept the lenses till they were prescribed and worn for some time. The degree of hyperopia was determined in this case by the ophthalmoscope.

Only those not skilled in the diagnosis of refractive errors with the ophthalmoscope will require atropine to make a satisfactory measurement of an error of refraction.

DEC. 8, 1885.

DR. BUCKLIN:

Dear Sir—What is the highest degree of myopia measured, also the highest of hyperopia? As there are a few cases of very high degrees of myopia and hyperopia that come to the optician for correction, not being able to pay the traveling expenses to and fee of an oculist, would it not be a good plan to enlighten us in the treatment of cases ranging below No. 5 in both of these affections? Are there many who need glasses for 3 to 2 and any below 2? We notice James W. Queen & Co. give a table to be used in fitting lenses to near-sighted people. Do they construct it from actual experience or can it be "figured" out?

Degrees of hyperopia and myopia certainly exist as high as $\frac{1}{4}$. I have seen degrees as high as $\frac{1}{2}$. Their correction is unsatisfactory. One must remember that an eye which has a very high degree of hyperopia is one which has been imperfectly developed, and usually the sight is imperfect, independent of the error of refraction.

A myopia eye is an eye which is stretching, has been stretched or will be stretched. The structures of the eye-ball are soft from inherited tendencies or have been softened by disease.

The stretching process usually greatly damages the retina. Occasionally the stretching will take place in the lateral vertical meridian of the globe, thus leaving the portions of the retina required for vision in a perfect condition.

Prof. Ludwig Manthuer, of Vienna, has a high degree of myopia, and still has more than $\frac{2}{3}$ of normal vision.

During a personal conversation with him he told me that his eyes had undoubtedly stretched without involving the posterior pole of the eye-ball.

Prof. Graefe and Manthuer both agree that the degree of correction any given myopic person, can never be determined except by practically experimenting with lenses.

One person having $\frac{1}{10}$ myopia will tolerate a full correction; exceptional cases will not tolerate any correction, while others will only accept a partial correction.

I have never gained any assistance from tabulated experience. The very first case you see is liable to be an exception to all your previous experience.

Mrs. F., age 60, has complained of her sight gradually failing her for the past three years. She can still see objects with her right eye, but she has entirely lost the sight of the left eye. She has never had red or painful eyes, neither have the eyes ever received any injury.

Deep in the pupil there is a milky spot which covers the entire pupil. With the bad eye she can distinguish the light from a candle at twenty feet. She sees it equally well when held above, below, to the right and to the left.

With her back to the window she can just distinguish figures at two feet. Please be kind enough to let me know if the sight of the bad eye can be restored.

The case is one of the most favorable. She has cataract with a perfect retina behind it. The removal of the cataract will give her most excellent vision.

Mr. B., age 30. Five years ago he began to see fog in left eye,

vision became obscure and eye became red and painful; cataract formed.

Three years ago the left eye was operated upon at the Eye and Ear Infirmary; previous to the operation the person could see light well if held below the eye, but was uncertain when it was held above.

After the operation there was no vision left in the eye. The right eye now has cataract; he can see light of a candle at ten feet. There is, however, quite a space where the light of the candle is lost as it is carried from the floor upward. Can the sight be restored to this eye? Please let me know.

The retina is detached to a considerable extent. The detachment corresponds to the space where the light of the candle is lost in moving it from below upward.

The cataract could be removed easily, but as no increase of vision would be obtained by the operation, it is not advisable to operate upon the eye.

[Reprinted from the Mineral Statistics of the United States for 1883-1884. Edited by Mr. Albert Williams, Jr. Published by the Geological Survey.]

Precious Stones.

BY GEORGE F. KUNZ.

Continued from page 403.



R. W. W. JEFFERIS* announced that amethysts of a rich purple color had been found in the northern part of Newlin township. Splendid crystals, one weighing 7 pounds, though not gem material, were found at Morgan Hunter's farm in Upper Providence. Other localities are Astor, Concord, Marple and Middletown townships. Near Twaddle's paper mill, in Birmingham, they are found in clusters, and in isolated crystals near Dutton's mill; also at Chester and Thornbury, Delaware county, Pennsylvania, where many fine gems have been found, well known among the cabinets.

Hoffmann mentions amethysts on the mesa near the mouth of the Rio Virgen, Nevada. In Llano and Burnett counties, Texas, some very fair amethysts have been found; and at Grand Rapids, Wood county, Wisconsin, also in the amygdaloid on the Lake Superior shore, and in Michigan in trap rock at Keweenaw Point and Point Aux Peaux, Monroe county.

In the Yellowstone National Park and at Holbrook, Arizona, amethysts line the hollow trunks of agatized trees, varying in color from light pink to a dark purple, and forming a beautiful contrast with the chalcedony and banded agate sides of these specimens. They occur also in small crystals at Nevada and neighboring localities on Bear creek, Clear Creek county, on the summit of the range east of the Animas, Colorado. The Lake Superior variety found at Prince Arthur's landing, often of large size, is spotted with the coating of red mosslike markings so well known, giving them a moss-amethyst effect if cut, though as a rule the coating is so even as to cover the entire surface, and nothing but a brick-red color is visible unless the crystals are broken. Notwithstanding the abundance of this mineral but few gems could be cut from this locality. The West Shore railroad tunnel at Weehawken, New Jersey, brought to light a few very fair amethyst specimens in the volcanic rock.

The most remarkable amethyst as yet found in the United States has lately been deposited in the National Museum by Dr. H. S. Lucas. It is a turtle-shaped prehistoric chipping, measuring $2\frac{3}{4}$ inches in length, 2 inches in width and $1\frac{1}{2}$ inches in thickness. The entire piece is transparent, flawless, and would afford a remarkable gem if cut.

Citrine is mentioned by Hoffmann† as occurring at Tuscarora, Gold Mountain, and in Palmetto Cañon, Nevada. At Taylorsville

and Stony Point, North Carolina, a number of clear pieces of this material were found that cut fair stones weighing over 1 ounce each. Occasionally at the Herkimer and Lake George localities quartz crystals have a fine citrine tint.

Smoky quartz.—The quartz of Herkimer county, New York, and Diamond island and Diamond point, Lake George, is at times of a variety of beautiful smoky tints and exceptionally pellucid. Some fine smoky quartz has been found at Goshen, Massachusetts, and by Mr. Gideon Bearce, at Minot, Maine. A mass of fine clear smoky quartz weighing over 6 pounds, with clear spaces several inches across, was found in the summer of 1884 on Blueberry hill, Stoneham, Maine; and a fine crystal over 4 inches long and 2 across, very clear in parts, was found near Mount Pleasant, Oxford county. Dr. Genth‡ mentions smoky quartz near Philadelphia; on the Schuylkill, near Reading, Berks county; near Hammerstown, Dauphin county; in Upper Derby, near Garret's road tollgate, and near the Kellyville schoolhouse, all in Delaware county; also at the tunnel near Phoenixville, and in East Nottingham and Birmingham townships, Chester county. In certain parts of Delaware and Chester counties the amethyst and smoky quartz gradually shade into each other, a characteristic peculiar also to many from the North Carolina localities. Alexander, Burke and Catawba counties and other localities afford fine smoky quartz crystals. Some very fine ones have been found at Iron Mountain, Missouri.

From a region 20 miles west of Hot Springs, for about 60 miles westward, the quartz crystals, as a rule, are all doubly terminated and detached, and are found loose in the sand between the breaks or veins in the sandstone, which somewhat resembles the calciferous sandstones of Herkimer, New York. At that part of this region called "the gem country," nearest Hot Springs, the crystals are quite white, but gradually shade into a dark smoky color at the other end of the district. As a rule, all the quartz is filled with fluid cavities. Some four hundred crystals with liquid inclusions were obtained from two veins of sand within three days.

Most of the cut articles of smoky quartz sold at the tourist localities are of foreign material cut abroad at a very low figure. Smoky quartz pebbles are rarely found in the sands along our coasts. At the watering places, such as Long Branch and Cape May, they are, however, occasionally found and cut as souvenirs.

The Pike's peak region at Bear creek is by far the richest locality for smoky quartz, and many thousands of crystals have been procured from 1 inch to 1 foot, and sometimes over 4 feet long.§ Considerable of this material has been sent abroad for cutting. Crystals are also found on Elk creek and the Upper Platte. Smoky quartz is found near Placerville, El Dorado county, California, in the placers. A fine large crystal 6 inches in diameter was in the cabinet of Dr. White, of Placerville.

A specimen of the rose quartz from Stow, Maine, cut into a long double cabachon from a massive transparent piece of quartz, distinctly shows the asteria effect similar to the star sapphire, if viewed by sunlight or artificial light.

Aventurine¶ quartz has not been observed from any American locality in fine specimens, although mentioned by Dr. F. M. Endlich as occurring on Elk creek, Colorado. Prof. John Collett has lately found a few small specimens of white aventurine quartz pebbles in the drift near Indianapolis.

Rose quartz.—At Stow, Albany, Paris, and a number of other localities in Maine, the veins of quartz shade from a white, transparent and opalescent color resembling hyaline quartz, often without any imperfections, through faintly tinted pink and slightly salmon-colored shade, into a rich rose color, thus forming a beautiful series of tints that have merit for a common gem or for ornamental stone work. Possibly as fine transparent opalescent rose quartzes as have ever been found were recently obtained, in pieces free from all flaws, of a fine

* "Proceedings Philadelphia Academy of Natural Science, Mineralogical Section," page 44.

† "Mineralogy of Nevada."

‡ "Preliminary report on the Mineralogy of Pennsylvania," page 58.

§ Dr. A. E. Foot's cabinet.

¶ Tenth Annual Report, F. V. Hayden, Geological Survey, 1876, page 150.

rose-red, with a beautiful milky opalescence, 4 by 5 inches in size, at Round mountain, Albany, Maine. A beautiful opalescent quartz has been found at Daw river, Stokes county, North Carolina. Rose quartz is found at many localities in the granites of Colorado, also in fine specimens at the head of Roaring fork, from near Clear creek and on Bear creek. It is mentioned by Hoffmann, from Tuscarora, Moray and Carlin, and Silver Peak, Nevada[¶]; also by Sweet* in crystals from Grand Rapids, Wood county, Wisconsin.

Prase.—Prase is found always crystallized at the various limonite deposits on Staten Island, New York. As specimens the mineral is very good indeed; groups of crystals are often 8 or 10 inches across, although the crystals are rarely over one-half inch long and one-eighth inch in diameter. The color, as a rule, is a dark leek green of no gem value.

Prof. W. P. Blake† mentions a greenish-tinged quartz resembling datolite in color, from the French Lode, Eureka district, California.

Hoffmann, in the "Mineralogy of Nevada," mentions prase in crystals at Reese river, San Antonio, and occasionally on the mountain near Silver Peak.

A translucent leek-green variety‡ of chalcedony and quartz occurs in the syenitic range of the Lehigh, especially at the allanite locality, 5 miles east of Bethlehem, Pennsylvania. Prase is found at Blue hill, Delaware county, in doubly terminated crystals, in curious crossings and rosettes several inches across; also in inferior specimens near Dismal Run, Delaware county. Very fine quartz§ occurs in its massive variety at George Van Arsdale's quarry, Bucks county; in Delaware county at Radnor; and in East Bradford township, Chester county.

Quartz inclusions.—The quartz inclusions as they occur in some varieties are sometimes of great beauty, and constitute an important part of the American gem minerals. As some of these are quite rare and little known among collectors, mention of a few of the leading American localities may not come amiss.¶

Two of the finest known specimens of rutilated quartz are of American origin; they are massive smoky quartz, evidently parts of one crystal. One of them was originally in the possession of the late Dr. Chilton^{¶¶} as early as 1847, and is now in the Vaux cabinet at the Philadelphia Academy of Sciences. It is about 7 by 3½ inches, and is completely filled with transparent essonite-red crystals of rutile, some of which are over 6 inches long, and from the thickness of a knitting needle to that of a thin lead pencil; the larger crystals are slightly flattened. The other belongs to Prof. Oliver P. Hubbard,** of Dartmouth College, and is 7 inches long by 3 inches across, and of a rich smoky color. The included crystals are a fine essonite-red, but not thicker than a knitting needle. Both were brought from some Vermont locality now unknown, believed, however, not to be Bethel or Rochester, notwithstanding that these localities have furnished many fine crystals of similar size filled with beautiful rutile. Beautiful pieces of quartz 3 by 4 inches, and fine crystals of quartz penetrated by beautiful clove-brown and black rutile were formerly found at Middlesex, Vermont.

Rutilated quartz of unexcelled beauty, the rutile usually brown, red, golden and black, has been found at many localities in Randolph, Catawba, Burke, Iredell and Alexander counties, North Carolina; and during the last year, at the emerald mine at Stony Point, crystals of quartz have been found 3 inches in length, and filled with rutile as thick as a knitting needle. Fine pieces of quartz 4 inches square, containing acicular rutile of a rich red color, were found near Amelia Court House, Virginia. Some fine acicular crystals of rutile in limpid quartz in the possession of Mr. Joseph

Wharton, were found near Knitzer's, Lancaster county, Pennsylvania.

Mr. Samuel R. Carter has in his cabinet cut specimens of pieces of bluish quartz filled with small acicular crystals of incicolite, somewhat resembling rutile in quartz, with the exception of the blue color. These were found in pieces over 1 inch square at the famous tourmaline locality at Mount Mica, Paris, Maine.

The mining operations at Stony Point, North Carolina, brought to light a number of crystals of quartz, some 4 inches long and 3 inches across. Large pieces of quartz 3 inches square, filled with what appears to be asbestos or byssolite, form interesting and pretty specimens. The inclosures of what appears to be gothite in red fan-shaped crystals from North Carolina, also form very pretty and interesting gem stones.

A fine limpid crystal† of quartz, 1 inch long and two-thirds of an inch in diameter, penetrated by fine green crystals of actinolite one-half millimeter in diameter, is said to have been found at some Virginia locality. The so-called Gibsonville emerald, exactly similar to the above, the crystal being 3 by 2 inches, was plowed up in a field at Gibsonville, North Carolina.

Some crystals of limpid quartz have been found in California containing particles of native gold; one of these was said to be 1 inch long, and to inclose a scale of gold about the size of the end of a finger nail. Two of these inclusions, not so large, are in the possession of Rev. W. C. Hovey, of Minneapolis, Minnesota.

In Nevada county, California, in the Grass Valley mines, quartz is often found supporting gold between the crystals. Pellucid crystals of quartz, some 1 inch long and three-fourths of an inch across, filled with a very brilliant stibnite projecting in all directions and some of them curiously bent, were found at the Little Dora mine, Animas forks, San Juan, Colorado. Mr. John W. Palmer, of Chicago, owned a very fine one. This material is capable of being made into one of the finest of this class of gems that have been found at any locality.

The beautiful specimens of limpid milky quartz, and also quartz crystals, the latter at times from three-fourths of an inch to 2 inches long, are found penetrated by crystals of black hornblende, varying in size from acicular to those one-sixteenth inch in diameter and at times 6 inches long. They interlace and penetrate the quartz in every direction, making a very beautiful gem and ornamental stone. Fine pieces 6 inches square have been found. It occurs at the quarry at Calumet hill, Cumberland, Rhode Island, where the workmen, as a rule, knowing its value, secure the best specimens for disposal to the greatest advantage. Some hundreds of pounds of this material were sent abroad a few years ago to be cut up for jewelry at Idar and Oberstein. As, however, work has been suspended at the locality, the mineral is likely to become somewhat uncommon. Cut specimens sell at from 50 cents to \$5, and specimens polished on one side at from 25 cents to \$5. This locality is one of the best known for this association.

Among other inclusions that might be utilized for gems may be mentioned the following: Crystals of quartz filled with specular iron found at the Sterling mine, Antwerp, New York; quartz including scales of hematite from King's Mills, Iredell county, North Carolina; dolomite in pellucid quartz from Herkimer county, New York; crystals of quartz containing crystals of the green spodumene (hiddenite) from Stony Point, North Carolina, and fine inclosures of chlorite and mica, green when viewed through the side of the prism, from several North Carolina localities.

The corals and sponges of Tampa bay, Florida, which are so often found there altered to chalcedony by the silicious waters, are at times filled with fluid that was imprisoned while the regular deposition of silica closed the apertures that admitted the silicious water. These, as well as the ones found in Uruguay, the so-called hydrolites or waterstones, are always lined with drusy quartz. If not as beau-

¶ "Mineralogy of Nevada."

* Sweet's "Minerals of Wisconsin."

† "Catalogue of Minerals of California," 1866, page 20.

‡ Preliminary report on the Mineralogy of Pennsylvania, page 59.

§ Preliminary report on the Mineralogy of Pennsylvania, page 58.

¶ See also paragraphs on rutile, amethyst and garnet.

¶¶ "Proceedings American Association for the Advancement of Science," 1849.

** "Proceedings American Association for the Advancement of Science," 1849.

† Cabinet of Tiffany & Co.


tiful as those from Uruguay they are even more interesting, and have been sold at from \$2 to \$20 each.

The crystals of quartz from the Herkimer (New York), North Carolina and Arkansas localities, containing fluid cavities with moving bubbles, are at times cut into ornaments which are not only interesting but pretty. One of these pure limpid crystals with a crescent-shaped cavity, from Little Falls, was mounted in a pair of gold ice-tongs to represent a cake of ice. These crystals are valued at from \$1 to \$25 each. In Rabun county, Georgia, the fine anethysts often contain these cavities nearly 1 inch long and would afford good gems, as would also those from Stow, Maine.

The quartz pseudomorphs, after calcite cleavages, from the locality 2 or 3 miles northwest from Rutherfordtown, Rutherford county, North Carolina, at times contain liquid in irregular-shaped cavities, and from their breaking out in good shape can be utilized for curious ornaments. This variety of quartz was also found by Mr. J. A. D. Stephenson, in Iredell county. Possibly the finest specimen is one belonging to Mr. W. B. Dinsmore, of New York City. It is about 1 inch long, and the surface is coated with a beautiful bluish white chalcedony with a curious rough surface, and it is perfect on all sides, with a free movement of the bubble. It is so thin and so filled with liquid that the liquid would weigh fully twice as much as the quartz walls. It is of the proper size and sufficiently beautiful for personal ornament. As nearly as can be ascertained it is from some locality in Georgia.

(To be Continued.)

Automatic Time Recorder.

HE NEW HAVEN Clock Company has recently put into service at their factory a new method for recording the time when the several workmen come to the factory in the morning, and the time of their leaving at night. Where several hundred workmen are employed some record of their comings and goings is necessary to prevent the shirks imposing upon their employers and their fellow workmen. The automatic register is thus described:

The machine or mechanism is located on a wall at a point which all the men pass in entering and leaving, and is a harmless appearing box about three feet in height by one foot in width and one foot in depth. The contrivance is a methodically regular clock, which by a peculiar attachment opens and closes a small slot in the middle of the front of the box. In a rack near at hand are as many numbered brass checks as there are workmen in the department, and each of these 200 workmen is known by the number which adorns his individual checks. On arriving in the morning each man takes his own check from the rack, and stepping up to the clock, inserts the check in the slot. If he arrives before five minutes past 7 o'clock, at which time the clockwork automatically closes the slot, his check will fall into a certain compartment inside the box. The slot remains closed but a moment and again opens, and remains so until 7.30 o'clock. Any one who arrives between 7.05 and 7.30 o'clock, will thus have an opportunity to insert his check, but will fall into a new compartment. At 7.30 the slot closes again, and all the checks inserted thereafter will fall into a third compartment in the box. At each change a gong sounds. From 8 o'clock and until 11.30 the slot remains closed.

An inspection of the checks in the several compartments will readily show whether a man arrived before 7.05, between 7.05 and 7.30, or between 7.30 and 8 o'clock. Those who arrive between 7.05 and 7.30 are docked a half hour's pay, and those arriving between 7.30 and 8 o'clock, one hour's pay. As but one hour's grace is allowed, any man whose check has not been inserted will be docked a half day's pay.

At half-past eleven o'clock the slot again opens, and every man on

leaving is required to deposit another check. If he leaves before 12 o'clock his check will drop into the 11.30 compartment and thus report him.

In the afternoon the slot closes at 1.05, 1.30 and 2 o'clock, also at 6 o'clock, so that an automatic record is kept of each man's comings and goings. As the clock is constantly under the eye of the superintendent in the office, no man can leave or enter without inserting a check, and hence the arrangement is secure against trickery. It is an improvement upon an old arrangement of the kind, and Hiram Camp is its designer. After January 1 a similar clock will be introduced into the movement department.

Gossip of the Month.

IT IS not many years since a watch was regarded as a luxury, and was taxed as such by our government, and by State and municipal authorities as well. But the introduction of machinery to the watch-making industry, by the use of which accurate timekeepers can be produced at moderate cost, has made the wearing of them by men and women such a general custom, that a watch is no longer regarded as an article of luxury but one of absolute necessity to ordinary business men. Indeed, in these active, busy days, when time is measured by fractions of seconds, and each fraction plays an important part in business transactions, it is difficult to conceive how we should get along unless the wearing of watches was a universal practice. But the law recognizes a difference in watches, and while no line of demarkation has been laid down between watches that may be regarded necessary articles of wearing apparel and those which should be classed as luxuries, the courts are inclined to regard a watch whose cost did not exceed \$100 as a necessity, while one costing more may be claimed to be an article of luxury. This question was recently passed upon by the Supreme Court of Oregon, in the case of *McClung vs. Stewart*, when the court said:

The question whether a watch is a necessary article of wearing apparel, and as such exempt, seems from the decisions to depend upon the particular facts or attendant circumstances of each case, such as the value of the watch, the condition and business of the debtor, etc., and has been differently decided under different circumstances. It is probably true that a watch is ordinarily worn more for convenience than as a mere luxurious ornament. But to determine whether it is one or the other, necessary or luxurious, as an article of dress or apparel, the value of the watch is allowed to have a controlling influence in determining the result. If the value of the watch be unreasonable, or too much money be invested in it, the law regards it, as justice to the creditors would require, rather as a luxury than a necessity, and under our statute this element of value would necessarily become an important factor, as the exemption of "wearing apparel" is limited to \$100. Upon the question whether a watch is a necessary article of wearing apparel the authorities are conflicting. Upon the whole our own judgment inclines us to the opinion that the phrase "necessary wearing apparel" as used in our statute may include in it a watch of moderate value without doing violence to its meaning. We are not, therefore, prepared to say that a watch of moderate value is not a necessary article of wearing apparel, and as such exempt when it is made to appear affirmatively that the watch and other articles of apparel selected or reserved do not exceed the amount limited by the statute.

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UP TO the present writing Congress has taken no definite action on the bill to suspend the coinage of 80 cent silver dollars. Several members have sought to make political capital and to cover themselves with glory by making long-winded speeches on the subject, but speeches are not entirely satisfying to the appetite of the business men of the country, which demands an honest, legitimate currency based on a gold medium. The advocates of the present silver bill, if not numerically strong, are conducting an active campaign according to Chinese methods, making a vast amount of noise, beating their "tom-toms" and defying the entire civilized world to undertake the demonetization of silver. They have established their camp

and headquarters in Washington, and are prepared for offensive or defensive movements upon Congress. They have also established a "literary bureau" whence are issued those screaming editorials that appear in various papers in different sections of the country, clamoring for the continued coinage of the swindling silver dollar. The indications are not flattering for the repeal of the bill that requires the government to coin \$2,000,000 a month of the debased silver dollars, but there is a fair prospect that a compromise will be reached that will lead to the re-coining of the \$250,000,000 of "Lydia Thompson" dollars, worth eighty cents each, into dollars worth 100 cents each. This will be a great point gained by the friends of honest money, and when it is found, after a year or two, that even an honest silver dollar is not required by the exigencies of commerce, it will be less difficult to establish gold as the only and true foundation for our currency issues. President Cleveland, in his annual message, showed that at no time had the requirements of commerce utilized more than \$50,000,000 in silver dollars of the present value; possibly if made worth a dollar in gold the country may absorb \$100,000,000 in business transactions. But there have been already made about \$250,000,000, and the supply is being added to at the rate of \$2,000,000 a month. What is to become of the surplus that the country cannot use? Obviously they will be stored away in the Treasury vaults, where now repose nearly \$200,000,000 of the present debased silver dollars. What earthly good they will do there, or how their accumulation on storage is going to make money more plentiful it is impossible to conceive. The banks are now loaded down with money; they have it stored away and would be glad to get rid of it on easy terms; but the masses cannot get hold of it unless they have some equivalent to give for it. No man will ever be able to have plenty of money until he is able to buy it, either with his labor or something that is worth money, unless he is a confidence operator and resorts to criminal methods to obtain it, and any man who has an equivalent for which there is a demand to give for money can get it at any time. The government may coin \$50,000,000 a month, and it will not put an additional dollar into the pockets of any honest man who does not buy it at its face value. The demagogues' cry that "silver is the people's money" is the veriest bosh; brains, labor and productive energy are "the people's money," and for these they can always get valued received in good, lawful currency. Unless the government scatters these silver dollars broadcast among the people, the continued coinage of them will never "make money easier," for as long as they are stored away in the Treasury vaults they might as well be bars of lead for all the use they are as a circulating medium.

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SOME of the dealers in Japanese art goods are reported to have worked off large quantities of their old stock, through the medium of the "Japanese Village" that has been on exhibition in this city for some time. This "Japanese Village," with its various artisans at work in the presence of the audience, has been the fashion of late, and everybody, with his children, have paid them a visit. Of course, they have had "the works of their hands" on sale, and everybody *and* the children desired to carry away some souvenir of his or her visit to the Village. Hence the demand for Japanese goods has exceeded the capacity of the artisans at work to supply, but the stock on hand has never seemed to visibly diminish. It is reported that this show has afforded an outlet for a large amount of Japanese goods that had grown stale in the hands of New York dealers, and that an excellent profit has been made out of the transaction. A visitor watches the almond-eyed Jap spin up a beautiful little vase from a lump of clay; he sees other Japs decorating vases after their peculiarly ugly methods; in the salesroom he sees just such vases similarly decorated, and jumps to the conclusion that they were made by these same artists, so he pays two prices for the vases as a

souvenir of his visit and to remind him of the individual Japs he saw at work. From a sentimental standpoint his purchase is creditable to him, but practically he could have saved money by buying his vases at some of the Japanese stores or the fancy bazaars where the Japs bought theirs. It is only a trick of the show business, and it has become legendary that the people like to be humbugged by showmen.

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SPEAKING of Japanese goods, a novelty in that line is a gold pin, the head of which is a broad surface in which are cut Japanese characters which, being interpreted, are found to be mottoes, such as "Good Luck," "Long Life," etc. Yankees may be expected to improve on this, and make pins bearing the motto "The Lord will Provide," or "God Bless our Home." The pins are not especially handsome, but being odd, they are attractive and consequently salable. They are quite the rage in Boston.

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THE Supreme Court of Appeals, of Virginia, has at last concluded to accept the decision of the Supreme Court of the United States, to the effect that the law of that State taxing commercial travelers is unconstitutional. It has taken the judiciary of Virginia several years to make up its mind that the United States Supreme Court is authority on constitutional law, but now that it has done so it is to be hoped that the officers of the various cities will cease to annoy commercial travelers, either with blackmailing threats or positive arrests. It was a case arising in Virginia that formed the basis of the decision rendered by the United States Supreme Court, declaring the law unconstitutional; this was several years ago, but Virginia has gone on collecting license fees under it the same as before. But now that her highest court accepts the decision of the *very* highest court in the land, there can be no further excuse for robbing travelers in that State under that unlawful statute. Indeed, any officer arresting a traveler for non-payment of "the drummers' tax" becomes liable to prosecution for false imprisonment. Travelers who have suffered annoyance in Virginia heretofore will please make a note of this and even up the score if opportunity offers.

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SINCE the above paragraph was written, the United States Supreme Court has repeated its decision declaring the tax imposed on commercial travelers in various States to be unconstitutional and void. The case was that of Samuel A. Walling, who was arrested and fined in a police court at Grand Rapids, Michigan, while selling liquor for a Chicago house. Walling appealed to the County Circuit Court and also to the State Supreme Court, both of which affirmed the decision of the lower court. Walling then took the case to the Supreme Court of the United States, and on the 18th inst. Justice Bradley handed down a decision declaring the Michigan law to be unconstitutional and void. He declares substantially that while a State has a right to regulate commerce within its own borders, it has not the right to discriminate against the citizens and products of other States in favor of its own citizens and products. Also, that such a law is an attempt to regulate commerce between the States, which is usurping a prerogative of Congress specially conferred upon it by the Constitution. Recently a committee of the Commercial Travelers' Association visited Washington for the purpose of inducing Congress to pass a law prohibiting any State from levying a tax on commercial travelers, and a bill to that effect has been introduced in the House. This is as far as it is likely to go. Congress has no more right to interfere with State legislation than a State legislature has to interfere with Congress. If, however, a State legislature

passes an unconstitutional law the courts will set it aside, as in this case, and when it has once been judicially declared to be void, any officer who attempts to enforce it, does so at his peril. In the case of the "drummer's tax" laws, every traveler has the authority of the Supreme Court of the United States for resisting it, and, if arrested, can obtain redress in a suit for damages against the person taking him into custody. Commercial travelers have been too long victimized by these unjust laws, and it is time they refused to pay blackmail to town constables and city policemen.

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MINNEAPOLIS, Minn., is undoubtedly an important and growing city, but when it undertakes to compare itself to Chicago, it should keep in mind the sorrowful fate that overtook the ambitious frog that strove to swell itself up to the size of an ox—there was nothing left of the frog but a pair of yellow breeches suffering from a compound comminuted fracture that robbed them of their usefulness. But this is what Minneapolis has done in a recently issued exaggerated statistical exhibit of her industrial and commercial growth. This metropolis of the hyperborean regions boast of 110,000 population, a gain of some 75,000 in ten years; her commercial importance has kept pace with the increase in population. But Chicago has increased in both respects in nearly the same ratio, having now a population of about 800,000, and if Minneapolis ever reaches that number, Chicago will have run up to a couple of million or so. Both these cities are prominent as wheat centers, and it is the ambition of Minneapolis to handle more wheat in the course of a year than Chicago does. It is a good thing for the country that such thriving, pushing, enterprising cities should be developed in various sections of the country, for they serve as great distributing centers for the products of all sections, and tend to create and foster a growing demand for all our industrial products. In fact, it is an essential condition of the development of the country that there should be such commercial centers at frequent intervals, and one has but to glance at the map to pick out twenty that have experienced a phenomenal growth in the past twenty years. But it is astonishing that Minneapolis should have gone ahead of St. Paul, her near-by rival, and now has the audacity to attempt to knock chips off the shoulders of Chicago. It is an ambitious bantam, but should be careful lest its comb gets frozen during its six months of terribly cold winter.

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CORAL is supposed to be a very solid and heavy article to deal with, but we read in our exchanges of great masses of white coral floating on the ocean on the coast of Java. But, then, that was a tidal wave that tore these masses, weighing from thirty to fifty tons, from their ocean beds and carried them eight to ten miles inland. This tidal wave was caused by the Krakatoa earthquake, and swept the coast for hundreds of miles with irresistible force. War vessels were lifted from their moorings and swept inland, but the moving of these massive coral beds to such distances is one of the most remarkable illustrations of modern times of the immense force that can be concentrated in a volume of water. A good many persons find the breakers at Coney Island rather too much for them at times; what would they think of a Java tidal wave?

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THE annual production of gold from all the mines in the world is estimated at \$93,000,000, while the amount consumed in the arts is estimated to be \$61,000,000 annually, of which the United States uses about \$14,000,000. For the year ending July, 1885, the United

States imported \$18,000,000 more gold than she sent abroad, while our imports since 1880 exceeded the exports by \$183,000,000. That is to say, we had products that Europe was obliged to have, and to obtain them she had to send gold to pay for them. It is a favorite theory with many political economists that the gold consumed in the production of jewelry, gold plate, etc., is speedily returned to the melting pot and put forth again in other forms. To a limited extent this is true, but only to a limited extent. Gold when wrought into artistic forms receives an additional value equal to from fifty to one hundred per cent., by reason of the skilled labor expended upon it; to consign gold jewelry and plate to the melting pot is to sacrifice the workmanship, or the enhanced value, and few care to do this. A considerable amount of wrought gold, no doubt, meets this fate after it has served its purpose, for much is ephemeral in its nature; but real artistic work is handed down from generation to generation as family heirlooms, or is gathered up by collectors of rare and curious things, and does not reach the melting pot so long as it can be made to do duty as a work of art. The taste for accumulating artistic examples of superior workmanship in wrought gold is a growing one, and more of the precious metal is being hoarded in this manner at present than ever before, for the reason that better work is being done, and there is a better market for it as wealth is being acquired by a greater number of individuals. The census returns for 1890 will show a decided increase over that of 1880 in the amount of gold consumed in the arts.

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AS AN indication of what the holiday trade amounted to in this city, a manufacturer of jewel cases informed us that the day before Christmas he sold six hundred cases to private parties to hold the jewelry they had purchased as presents to friends. As a large proportion of the fine goods sold at retail includes the cases in which it is kept, it can be seen that a very large amount in the aggregate must have been disposed of to create such a demand for separate cases. Probably many purchasers were dissatisfied with the cheap cases in which the jewels were when purchased, and preferred something richer and of their own choosing. Our informant further stated that many of the sets he cased contained diamonds or other precious stones, which goes to show that purchasers were not niggardly in their expenditures for holiday presents.

Precision Clock Cases.



THE CASING of a precision clock is only secondary in importance to the compensation of its pendulum. The best construction of an efficient case can be ascertained only by most careful study of the conditions under which the clock is expected to be a standard timekeeper, and often the entire high accuracy sought by refined construction is sacrificed by an inefficient case and mounting.

The objects of casing a precision clock are as follows:—

- a. To protect the mechanism from the effects of dust and dirt.
- b. To avoid changes of temperature and barometric pressure.
- c. To provide an enclosed space in which the gas medium in which the pendulum swings shall have any chemical constitution, of any hygroscopic condition.
- d. There must be provided ready means of seeing and changing the condition of the pendulum, electric apparatus, movement, etc., without disturbing the case except locally.

Now if we hold the above considerations in view we can readily see that cast iron, wood and glass, with joints of wash leather (which is kept soft by a wax cement which does not become rancid with age), are the preferable materials.

The advantages of using cast iron for the pillar or body of the case

are that it can be cast in such a shape as to require very little finishing afterwards, and that only such as planing parallel surfaces in iron planing machines. It makes a stiff column for mounting the pendulum when it rests upon a masonry foundation from below. Plates of glass can be clamped against the planed surfaces of iron piers (by putting waxed wash leather between the glass and the iron) so as to make air-tight joints without difficulty.

The mass of iron symmetrically surrounding the steel pendulum is the safest protection the clock can have against casual magnetic disturbances. In the language of electricians it "shields" the pendulum.

Suppose then we adopt as the first type of precision clock case which our present knowledge suggests, that of an iron cylinder or rectangular box resting on a masonry pier, and which has a table top to which the massive pendulum bracket is firmly bolted. This type admits of the weights being dropped in small cylinders outside of the cast iron cylinder or box. These weight cylinders, of course, end in the table top of the clock case above and in the projecting base of the flange of the clock case below.

With this construction it is a simple matter to cover the movement with a glass case, preferably made rectangular, with glass sides, ends and top, with metal cemented joints. The metal bottom edges of this rectangular box can be ground to fit the plane surface of the top of the clock case. Then, by covering the bottom edges with such a wax as was used in making the glass plates fit the iron case in front or back, we can secure an air-tight joint at the junction of the rectangular top glass case with the iron case. In practice the wax to be used may be made by melting together and stirring equal parts of vasaline and beeswax. The proportions may be varied to give a different consistency of wax, and it may be painted on with a brush after warming over a small flame.

If the clock case will be exposed to a comparatively high temperature, say 95° F., then the beeswax can be 3 parts to 1 of vasaline. The good quality of this cement wax is that it does not change with age, or at least for several years, is very clean, and can be wiped off completely with kerosine or turpentine or benzine. In all joints meant to be air-tight, the use of rubber packing is to be avoided. It answers well enough at the start, but after several months it is sure to crack and leak air.

By an air-tight joint I do not mean a joint which will not leak air under any pressure which may be applied. It is not necessary that our pendulum should vibrate in a vacuum; all we want is that the pressure inside the clock case should be uniform: that it should not vary with the barometer outside. In actual practice we find it best to have the pressure inside the case as nearly as possible to that outside. Now, if the barometer in a given locality never sinks below 27.5 inches, it is not necessary that the vacuum in the clock case be less than that represented by 29.5 inches of mercury pressure. So, too, if it were desirable to have the pressure inside the case greater than that outside, owing to some special form of joints which made the clock case less liable to leak *out* than to leak *in*, it might be that an inside pressure would be efficient at 31 inches of mercury. By not having the inside pressure vary but slightly from the outside, the actual pressure of air will not exceed one inch of mercury, or, say, ½ lb. pressure to the square inch. This is a pressure which causes quite an insignificant strain upon any joint.

There are objections, however, to the use of air in an enclosed space for precision clocks. Air is, comparatively speaking, heavy. It is 14½ times as heavy as hydrogen gas for instance. The pendulum, therefore, in moving through its arc has to push aside 14 times as much weight as it would have to in case it were surrounded by hydrogen. Then what might be called the "case friction" is greater than if we used hydrogen. By "case friction" I mean resistance and a disturbance to the pendulum depending on the effect of the currents of air produced by driving the air before the pendulum against the sides and front of the case. It is a well established observation that small, cramped cases disturb the clock's rate more

than large, roomy ones. This is because the air, having no room to go before the pendulum, is cushioned up against the side of the case at each pendulum swing, and acts as a resisting spring against the swing of the pendulum. By the time the pendulum has reached the end of its vibration the air has escaped upwards and downwards perhaps so that it no longer has its spring power to restore the loss of energy to the pendulum. This "case friction" is most pernicious in its action when associated with free falling weights in the clock case. Clock weights should *always* fall in separate compartments, and never in such a manner that they can affect the space in which the pendulum swings.

But this is a digression to explain the term "case friction" in its use in horology.

Precision clocks, almost without exception, have electric break-circuit attachments within the case. Most of these break-circuits are constructed so that there is a small spark every time the circuit is broken. The effect of such a spark in air is to convert a small portion of the air in the immediate neighborhood of the spark into nitrous acid gas. After several months there might be a considerable quantity of this gas in the case, with the certain result of rusting the nicer parts of the escapement.

Many attempts have been made to run a clock in an almost complete vacuum of air; but the volume to be exhausted is so large, and the leakage is so sure to occur after a time, that the attempt is now pretty generally abandoned. It will be inferred from what has preceded that a full atmosphere of hydrogen would only offer one-twelfth the resistance to the pendulum that air would, and all the disturbances arising from the surrounding mediums would be only one-fourteenth for hydrogen of that which we would expect for air. Every consideration, therefore, points to the use of hydrogen as the medium with which to fill our clock cases. It is inert, it forms no compounds under the influence of the electric spark, the case friction is no greater than would exist if we made an air vacuum of only about 1 inch of mercury, and hydrogen gas may be readily prepared. The method from dilute sulphuric acid and scrap zinc is the handiest, and it will be found described in almost any chemistry text book or encyclopædia. Should the horologist wish to know something of the chemistry of the process, without previous study, he will find it described in very simple language in Roscoe's "Primer of Chemistry," D. Appleton & Co., 549 Broadway, N. Y., publishers, the retail price of which I believe is fifty cents. The practical details of filling a clock case with hydrogen gas I have not yet worked out. It is evident that since hydrogen is 14½ times lighter than air, that by attaching a small tube to the source of hydrogen and to the top of the clock case, and another small outlet tube at the bottom of the clock case, that by gravity alone the hydrogen would fill the upper part of the case and drive the air before it out at the bottom. The hydrogen should be dry. To insure this it should pass through a tube containing chloride of calcium (*not* chloride of lime), which, if it is a foot long and an inch in diameter, will be sufficient. No burning light or electric spark must be put into the case while filling, because the mixture of hydrogen with the air is very explosive when ignited. Later I hope to give to the readers of the journal some form of apparatus which I have found by actual use to be expeditious for this purpose. I have the experiments now in progress.

The above discussion has not considered the temperature question. It is important that the changes of temperature in a clock case should be as slow as possible and as small as possible. Professor Rogers, of the Harvard College Observatory, has shown that such bars as are used in pendulum rods of clocks are often several hours in taking up air temperatures many degrees different from that in which they were. We have at the top of the pendulum a thin spring for suspension whose temperature decides its molecular friction (as I have pointed out in a preceding article), then we have the pendulum rod, and lastly the large bob, all of which take up any new temperature with different degrees of slowness. Now obviously no compensation can be made to act unless the temperatures are the same for all parts of

the pendulum, and vary at the same rate. A number of years ago, in that deceased but most admirable *American Horological Journal*, there was a long discussion as to the temperature at the top and bottom of clock cases. It was shown that this regularly amounted to several degrees in the best clocks. It was to lessen this difference that at the Harvard College Observatory the Bonds built a deep well in the cellar, purposing to put the clock at its bottom. The idea was a good one, and were it not for the difficulty in getting at clocks in wells, and keeping water out, it would doubtless find favor where the utmost accuracy is desired.

A better plan is to run the clock at a high temperature, say 95° to 100° F. The oil is more liquid, the temperature can be more easily maintained, it can all take place in lighted, dry rooms, and the means for doing this we shall now consider.

Our iron case must now be housed in another outside case, which had better be of wood, with glass windows for seeing the clock face. A single thickness of wood would conduct heat too rapidly. It must therefore be made of two thicknesses, with an air space between. If the air space is left unfilled, the circulation of the air soon causes the inner wooden layer to be of the same temperature as the outer. It is necessary to prevent this circulation of air therefore by means of some substance which is a non-conductor of heat and which will prevent the air from circulating. The very best thing to be used in this connection is cotton batting, which has been picked out until it is as light and fibrous as possible. Then if the doors and windows of the wooden case are made of two thicknesses of extra thick glass, and are firmly clamped, by screws through their sashes or some other means, to the frame of the case, we have the best form possible for our completed case of the type I have described. It now remains to provide a layer of hot water pipes inside the case, heated by circulating hot water from the outside. The flame under the water tank outside, whether of gas or kerosine, to be automatically raised or lowered by any such thermostat arrangements as are in common use with chicken incubators, when the temperature varies from the point desired. Experience teaches that the volume of water had better be considerable, say five or six gallons in the outside tank for a clock case holding 50 cubic feet of air and warmed by 15 feet of $\frac{3}{4}$ inch iron piping.

LEONARD WALDO.

Is the Watch Magnetized?



IT OCCASIONALLY has happened to me that I have suspected a certain wildness in a watch's rate was owing to magnetism. I have wanted to determine this without taking the watch down, or, indeed, stopping it even. I give the method I adopted (and which works beautifully) for determining the existence of magnetism in any part of the case or movement.

Very soft iron becomes quickly magnetized in the presence of a magnet, and loses almost its entire charge of magnetism when the magnet is removed. It is much more *susceptible* to magnetization than steel, that is, it is more quickly magnetized.

Heating a piece of iron to a red heat destroys every vestige of magnetism and leaves it perfectly susceptible to exterior magnetic influences. We have, therefore, in a small piece of soft iron wire which has been heated in the alcohol flame till it is red hot and then allowed to cool, an admirable "feeler" for magnetism. The neatest way to apply it is as follows:

Sharpen a willow or other bit of wood to a point. Slit the point and fasten in the slit one end of a silk fibre drawn from a piece of silk or from silk thread, the fibre being two or three inches long. Now take a piece of fine soft iron wire which has been heated as described and bend it, or, better still, make a complete turn in it, so that it can be attached by the turn or bend to the free end of the silk fibre. This piece of wire can be very small, not more than three

or four hundredths of an inch long. We then have an easily handled tool which we can apply to any part of the watch movement by bringing the suspended bit of wire near the suspected part. If there is no magnetism the little piece of wire will not be affected. If there is a trace even, it will stick to the part affected, and the whole watch can be explored, and only those parts affected can be picked out for treatment. The soft iron can be moved about without danger of carrying the magnetism from one part to another. I never use a piece which, after being heated, has come in contact with any other piece of iron or steel. Tested by as delicate an instrument as this little "feeler" is, I have been surprised at the number of tools and watch parts showing traces of magnetism.

It is not probable that the magnetization of staffs to balance or of pivots would affect the rate of ordinary watches to such an extent that their rates would be bettered by demagnetizing them. It is generally the case springs or the hair spring or the mainspring which does the mischief. A simple way to demagnetize small parts is to secure a horse shoe magnet in a lathe chuck by clamping it an inch or more from the face of the chuck between pieces of wood or brass, in such a way that the arms of the **U** may extend in a direction parallel to the axis of the chuck, and may be rapidly rotated when the lathe is run. The object in clamping it a little way out from the face of the chuck is to avoid magnetizing the lathe chuck itself.

Now give the magnet a rapid rotation and hold the small part with brass or bone pliers (anything but steel or iron) as near the rapidly rotating faces of the magnet as you can without striking. Then draw the piece slowly (an inch or so in ten seconds) away from the magnet, keeping the rotation up, and if the magnet is strong enough, the small piece will no longer be magnetized.

Several small magnets clamped together will be better than a single magnet. The effect of the whole should be great enough to give a decided pull to the part to be demagnetized, when held at the distance it must be held during the operation.

The principal on which the above operation depends is that a strong magnet will not only destroy, but will reverse the magnetism of a weaker magnet having the same pole near enough to the more powerful magnet. Thus a watch escape arm having one-half magnetized as a north pole, would have its magnetism reversed so that it becomes a south pole, if it be brought in contact with a stronger north pole of another magnet. If a south pole then be brought against the same part, the south pole will be destroyed and a north pole again formed. The intensity of the magnetization depends upon the closeness of the contact of the parts—and if the parts are drawn slowly apart, the rapid reversals of the magnet leaves the small part gradually freer from the effects of magnetism until there is finally none appreciable left.

To the intelligent reader who has followed the electrical articles in this journal, it will be evident that ordinary ingenuity will devise means for putting an electro magnet in place of the horse shoe magnet above referred to, with much better results. In this case make the magnet large, plenty of soft iron in the cores, wind with coarse wire (No. 14 to 16), and use Leclanche cells for the short time you want them. Make the connections by means of copper wire brushes rubbing against two collars which are insulated from each other by wood, and which are connected with the two ends of the wire of the completed electro-magnet. If the finished coils had cores half an inch in diameter, and were, say, three and a half inches long and an inch in diameter, operated by two or three Leclanche cells, the apparatus ought to be quite efficient.

LEONARD WALDO.

TO FILE A SQUARE HOLE.—When filing a square hole it is necessary to reverse the work very often; a square file should first be used, and the hole be finished either with a diamond-shaped or half-round file. This leaves the corners square, as they should properly be.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of December 15, 1885.

- 332,620—Button, Cuff and Collar. E. B. Nock, Brooklyn, N. Y.
 332,265—Clock Frame. R. W. Lucius, Mascoutah, Ill.
 332,678—Dials. Transferring Letters and Designs to. F. Schmalz, Assignor to Robbins & Appleton, New York, N. Y.

Issue of December 22, 1885.

- 333,083—Bracelet. C. S. Pine, Providence, R. I.
 332,719—Bracelet, Self-Closing. H. Liebel, North Attleboro, Mass.
 332,987—Clock Pendulums, Electric Synchronizing Device for. H. L. Bailey, Brooklyn, Assignor to Telegraphic Time Company, New York, N. Y.

- 332,694—Clock, Programme. W. Akin, New York, N. Y.
 332,891—Clock Regulator. G. L. Goodrich, Bristol, Conn.
 333,057—Watch Case. C. K. Kolby, Brooklyn, N. Y.

Issue of December 29, 1885.

- 333,261—Mainspring Winder. H. H. Pulver, Waltham, Mass.
 333,272—Scarf Ring, Band and Collar Stud, Combined. H. W. Aberlin, Bayswater, County of Middlesex, England.

Issue of January 5, 1886.

- 333,752—Collar Button. C. G. Harstrom, Peeksville, N. Y.
 333,873—Clock Case. J. G. Low, Chelsea, Mass.
 333,697—Jewelry, and Ornamenting the same. E. A. Thiery & C. P. Croselmir, Newark, N. J.
 333,738—Watch Case Ring, Machine for Making. E. Keller, Bienne, Switzerland.
 333,840—Watch Case Spring. C. Doerfinger, Sag Harbor, N. Y.
 333,737—Watch Springs, Die for Drawing. M. W. Elliott, Elgin, Ill.
 333,792—Watch, Stop. J. Tixier, San Francisco, Cal.

The Jewelers' Security Alliance.

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For further information, Application Blanks for Membership, By-Laws, etc., Address
 P. O. Box 3277. 170 Broadway, New York.

The regular monthly meeting of the Executive Committee was held on the 4th inst., attended by President Dodd, Vice-President Hayes, and Messrs. Alford, Bowden, Lewis, Parks and Secretary Champenois.

The following applicants were accepted as members:

Henry Abbott, N. Y. City; Wm. Arnold, Ann Arbor, Mich.; Jas.

C. Bates, Haverhill, Mass.; M. D. Fletcher, Springfield, Mass.; Hirst, Moore & White, Philadelphia, Pa.; C. Mayer, Austin, Tex.; Mackinney, Smith & Co., N. Y. City; Mackinney, Smith & Co., Philadelphia, Pa.; Mackinney, Smith & Co., Providence, R. I.; O. E. Ward, Phoenix, N. Y.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

SUPPORT FOR ARTICLES IN HARD SOLDERING.

To the Editor of the Jewelers' Circular:

Is there anything better than charcoal for holding articles while hard soldering? I often find that the coal burns away under a ring or whatever I am mending, and lets the whole thing fall apart just as the solder is ready to flow. Sometimes it lets the pieces move a little, and they are soldered together wrong, and have to be cut apart and done over. I have tried pumice stone, but that is no good—too hard to pin things on, and does not hold the pins well.

F. W.

[We recommend asbestos board—a thick layer of asbestos fibers. This substance is well known to be incombustible, and when felted together loosely makes a very good support for heating articles on. It resembles thick blotting paper in appearance, holds pins well and does not burn away any to speak of, at least during any ordinary mending operation. It has been considerably used by jewelers, assayers and others, but had one fault, it would curl up. It was made of two or more layers, and when heated the layers would separate and the outer one curl out of shape. This fault has been remedied by making a solid block in a single layer, with wooden frame or sides to keep it in shape and hold it by, thus making a very excellent support. This improvement is brought out by the Chalmers-Spence Co., 419 8th street, this city, where Mr. W. can obtain it in various forms. One form sold by them is a solid block having a cavity scooped out, large enough to hold a lot of pieces of gold or other metal to be melted. At one side of this cavity is a slot extending out a short distance. The scraps are put into the cavity and a flat piece of asbestos board laid over the slot, then the scraps are melted as usual. A piece of coal can be laid over them to increase and confine the heat if necessary. When all is fluid, it is only necessary to tip the block up endways and let the metal run into the slot between the two asbestos blocks, where it will soon cool into an ingot. This saves the risk and trouble of pouring the melted metal into another dish or mold to make an ingot. Before the melting the asbestos pores are closed by rubbing whiting over the surface.—ED.]

DEAD BLACK FINISH FOR BRASS WORK.

To the Editor of the Jewelers' Circular:

Can you inform me of any way to give brass work a dead black finish, such as optical instrument makers put on their work? I have tried the chemical processes, but do not have good luck with them for some reason. Would rather have some different way of doing it.

N. O. J.

[The chemical way is the most convenient, because the materials can be kept on hand ready for use whenever required, and if properly prepared and the brass parts are properly cleaned, success should be attained. The only other way we know is to make a sort of varnish to put on the articles, which could be prepared from lampblack and size. Get a druggist or dealer in paints to weigh out two grains of lampblack, which you will put into a smooth, shallow dish, such as a saucer or small butter plate. Dip the point of a lead

pencil into gold size, about half an inch, and let the drop of size fall from the pencil into the heap of lampblack, then mix as well as you can; then put in another drop and mix thoroughly as before; finally put in a third drop and mix. This should be enough to hold the lampblack together. Then add twenty-four drops of turpentine and mix and work thoroughly together as before. This can be thinly applied to the work with a camel's hair brush, and when thoroughly dried will give a first class dead black finish. If you have much of this to do, you could double or quadruple the above quantities of the materials, and keep the mixture in a bottle, well corked up, to prevent evaporation. If it becomes thick, add a little turpentine and work down to proper thinness.—ED.]

DISCRIMINATION BETWEEN DEALERS.

To the Editor of the Jewelers' Circular:

I have been in the retail jewelry business over twenty years, during which time I have bought goods of the leading jobbers in New York, Boston, Philadelphia and Chicago. I have never had a note protested, never asked an extension, but have always met my obligations dollar for dollar, at maturity. I have a competitor in this place, one of several, who has failed twice in business, paying less than fifty cents on the dollar each time, who is evidently preparing to fail for a third time. At least he is selling goods at about what similar ones cost me, and he certainly cannot afford to do so if he intends to pay for them. Now, what I complain of is that the travelers for the houses I buy from seem more anxious to obtain orders from him than they are from me. At least they seem to show more anxiety regarding his custom than they do about mine. Possibly they take it for granted that I will give them an order anyhow, while my competitor needs urging to look at their samples. Notwithstanding his record he can get all the goods he wants at the same prices and on the same terms that I can. Being a showy sort of a man, social in his nature and ready buying, the travelers hang about him and fairly force their goods on him. As a consequence he makes a greater display than I dare, and catches a good deal of trade, although the old residents stick by me. Now, I contend that the jobbers are treating me unfairly, and by encouraging my insolvent competitor—he has not a dollar outside of his stock—they are offering a premium on dishonesty; that they are, in fact, cutting my throat at the same time that they are placing temptation in the way of another. I know that the insurance agent who insures both our stores charges my competitor a higher rate than he does me, because, as he says, "the moral hazard is greater." Now, if the insurance men have discovered a "moral hazard" in the man's character and make him pay for it, why should not the jobbers in jewelry, some of whom he has already victimized, do the same thing? It seems to me that the discriminations made by jobbers is usually against the man who does the square thing and in favor of adventurers and speculators, men of unsavory reputation. I know that the cry is "when a man is down help him up and give him another trial;" but when the man persists in pursuing the practices that led to his previous downfall, and when those practices tend to pull down others whose reputations are unscathed, I say that it is time to call a halt in the charity business and come back to business principles. I may be unsympathetic and all that, but it has always seemed to me that the horse that never stumbles is more entitled to confidence than the one that is constantly falling and giving his rider heavy bruises. Why are not the retail dealers who pay their debts in full entitled to as much consideration in the trade as those who have compromised with their creditors two or three times.

ANCIENT DEALER.

Wisconsin, Jan. 10, 1886.

SELLING GOODS TO OUTSIDERS.

To the Editor of the Jewelers' Circular:

Much has been said and written about jobbers and manufacturers

selling goods outside what are termed the legitimate channels of trade. Now, I am both manufacturer and jobber, and retail dealer when circumstances warrant, and I propose to do business on this line just as long as I can find customers. As a manufacturer it is my business to sell my products just as fast as I can get the money for them, and put it into more goods, turning it over as frequently as I can. At every turn I expect to make a profit. In selling my goods I am governed by the old laws of supply and demand. If a man comes to me and wants a large quantity of goods and offers cash for them, I will make him a better price than I will to the man who buys little and wants long time to pay the bill. As an illustration: I had made up a line of goods for the fall trade, and they were selling moderately well in small orders to the trade; an agent for Macy's bazaar saw them and asked me to name a price for my entire stock. I gave him special figures and he accepted. In three days he had the goods in his store, and in three more I had the cash for them. That is simply an illustration showing why I sell to the outside trade—outsiders are better pay than the average retail jewelers, buy more liberally and do not ask four and six months time. As a matter of sentiment, the idea of confining trade to so-called legitimate channels is well enough, but it is not business. Any channel that brings me cash for my products can have them. And I venture to say that is the case with a majority of manufacturers of any kind of goods, however much some of them may prate about selling to the trade only. We are all here to make money, not to indulge in sentiment, and any one who wants my goods can have them for cash or its equivalent every day in the week except Sunday. If retail dealers cannot hoe their own row with outsiders it is because they lack enterprise and business qualifications. It is certainly no part of my duty, or of any other manufacturer, to bolster them up with credit, and then sacrifice cash business that they may monopolize retail custom. I am sick of hearing the incessant complaints of the retail trade about the bad practices of jobbers and manufacturers. If they had energy and enterprise enough to cover the field they undertake to cultivate there would be no room for outside competition, but a majority of them are content to rattle around in a position they cannot fill. Their inactivity and lack of enterprise has made outside competition possible, and for one I rejoice at these new outlets for our products. This may not be orthodox doctrine, but there's business in it. NEW BLOOD.

New York, Jan. 16, 1886.

[Our correspondent is outspoken in his sentiments, and, no doubt, is honest in them. There is much truth in some of his remarks, but they will not all bear analysis. The legitimate channels of trade would never have been broken through but for such manufacturers as he, who have induced outsiders to enter into competition with retail dealers, making them special rates for cash, thus enabling them to undersell the regular dealer. A more complete answer to his letter we reserve for our next issue, and presume, by that time, we shall hear from the other side of the question.—ED.]

To the Editor of the Jewelers' Circular:

DEAR SIR—I beg pardon for not giving more definite and complete information in regard to the tool spoken of in my last letter. I am unable to give you the name of said tool as it has not yet received one, but will call it an instrument for the exact measurement of watch glasses, their sizes and heights. Any glass can be correctly sized and exact height taken by this instrument. You can take any watch and find the exact size of glass that the bezel will require. You can also take this instrument and get the exact height of glass from the center post, etc., that the watch will require—from height 1 to 8. Any man, provided he is a good workman, having an American lathe, a Snyder chuck and this instrument, can fit a bezel himself without sending to a case maker, without once removing the bezel from the chuck until finished. If this tool was made a United States Standard, as Allen's Ring Gauge is to-day, and every jobber

and retail dealer possessed one as they should, then there would be no more guess work in ordering watch glasses, but *always* the watch glasses would be ordered with a certainty that they would fit. This tool was invented by Mr. B. B. Loar, of Newark, Ohio, who has a patent on the same, and who, I hope, will soon place them on the market. Now, next there is need of a Standard United States Bracelet Gauge. Who will be the first man to place before us a good one? My next letter will be from my new place of business.

Yours very resp'y, W. F. A. WOODCOCK.

Jan. 14, 1886.

A FEW WORDS OF COMMENDATION.

It is not often we indulge in self-glorification, or print in our columns the many pleasant things our readers say of us, but with the beginning of our new volume we feel impelled to let our readers see a few of the kindly expressions that are showered upon us:

A subscriber in the South writes us as follows:

"The January number of THE JEWELERS' CIRCULAR reached me this morning. Inclosed find \$2 for a renewal of my subscription. It is the most valuable journal in our trade printed in the United States. I have read them all and know whereof I speak. I would not be without it for many times its cost."

A New England subscriber forwards his renewal and says:

"I cannot possibly get along without THE CIRCULAR. I think it much improved under its new management."

A retail dealer in a prominent western city writes as follows:

"Enclosed find my subscription to THE CIRCULAR for another year, which will make the eighth since I began taking it. I find it so full of articles of interest and value to me in my business that I feel that I cannot get on without it. You can certainly count me a subscriber as long as I am in business."

One of our Pennsylvania dealers writes as follows:

"I have been a subscriber to THE CIRCULAR for ten years, and am free to confess that it has been better the past year than ever before. When Mr. Hopkinson died I felt doubtful about his place being filled satisfactorily, and THE CIRCULAR maintaining the high standard he had set up for it. I am now forced to admit that you have improved upon his methods and are giving us a better paper than he did. I am especially pleased with the articles on "Fashions in Jewelry," and also with your comments on current news and the commercial features of our business. Sometimes THE CIRCULAR used to be heavy with technical articles that could interest but few readers, but the new features you have introduced have livened it up materially. Please accept my congratulations and \$2 for another year's subscription."

These are but samples of many letters recently received, but these will suffice for this occasion. Our natural modesty prevents us from printing all the good things said of us.

The National Association of Watchmakers and Jewelers.



THE FIRST annual meeting of the recently organized National Association of Watchmakers and Jewelers was held at the Palmer House, Chicago, on Tuesday, Jan. 19, at 2 P. M. E. R. P. Shurly, President of the Association, occupied the chair, and about 40 members were present. Forty-one proxies were approved by Messrs. O. C. Land and Nordahl, the Committee on Credentials.

Secretary M. H. Berg read his report which showed that 223 members had already joined the Association. The cash received, together with what was in the hands of the Secretary and due the Association, amounted to \$1,115, while the expenses aggregated \$926.77, leaving a balance of \$188.23, of which \$78.23 was in the hands of the Treasurer and \$110 was due the Association. The assets of the Association exceeded the liabilities by \$214.23.

The Treasurer's report made a similar showing to that of the Secretary.

E. R. P. Shurly, the retiring President, in thanking the members of the Association for the honor which they had conferred on him in electing him President at the inauguration of the organization, referred to the large amount of work that had been accomplished towards the permanency of the society in spite of the fact that at the time the society was formed the holiday trade was just commencing. Much was due to the other officers for the success of their efforts, and especially was the Association to be congratulated on having an efficient Secretary, who had brought the workings of the institution into such shape as to secure its permanency. For the past twenty years the craft had, at various times, endeavored to form organizations that would protect the legitimate jeweler in the pursuit of his business. Such associations, when formed, had had only a spasmodic existence, that for a time promised good and shone brightly to the trade, but like a Fourth of July rocket went out in a blaze of glory. The old system of sell all the goods you can and "the devil take the hindmost" was left stronger than ever.

Why should such organizations have failed when it was apparent to the retailer that they were beneficial? The answer was plain. They were formed on the jug-handle principle, all on one side, or else in time used for the benefit of a clique or idea.

The only association that could exist to benefit the jewelry trade, was one founded as the National Association of Watchmakers and Jewelers had been, upon a broad platform that the manufacturer, jobber and retailer could stand upon, with the knowledge that each was bound to the other, and contributed to the welfare of the other. Previous organizations had produced ill-feeling among different branches of the trade instead of allaying it, but he believed that this Association would fill the void, producing a better feeling all through the trade than had ever before existed in this country. He sincerely hoped that all eligible for membership would join their ranks, and aid in the good work of confining each branch to its proper channel. Self-interest would prompt the watch companies, the watch case manufacturers, the clock companies, the manufacture of jewelry, and even the plated ware companies who had not come to do eventually join the Association in the good work of sustaining the legitimate jeweler. When this had been accomplished the battle was won. The first jobber that retailed to an outsider would find that his supply of watch movements would be cut off, and so with other goods. At the same time the sphere of the manufacturer would be confined to the jobbers. It was not necessary to enter into any argument to show that the most humane, considerate, generous class of people in the world were the jewelers. They supplied the outside world with their goods at a nominal profit, from the mechanical operation of putting in a pin tongue to the furnishing of the most elaborate watch turned out by any of the manufacturers. The jewelers worked for the community for less profit than any other business men. Before the year closed he believed that they would have branches in every State and town of any size in the Union. The aim of the Association was to be rational in its character, tolerant in its views, working for the welfare of all who wished to transact a legitimate jewelry business.

Before laying down his gavel he would say to the U. S. Guild, those gentlemen who had been working in their way to aid the trade: "Come into our ranks. You, like the pioneers of old, have made a path through the woods. We seek to make a broad and pleasant road for the trade to travel upon. Unite your labors with ours for speedy success."

The meeting then proceeded to the election of officers. J. Ruff and J. L. Rowe being appointed tellers. C. B. Shourds was elected President by acclamation. Mr. T. B. Myers, of Myers & Finch, St. Paul, was elected Vice-President. Otto Young was unanimously voted to the office of Treasurer; and M. H. Berg, of Hyman & Co., was re-elected Secretary amid loud applause. The following were elected members of the Executive Committee: E. R. P. Shurly, Charles Rowe, Otto Young, M. Ellbogen and L. F. Hussander.

The newly elected officers were then duly installed, and made suitable acknowledgements of the honor that had been conferred on them.

At the request of J. J. Altpeter, Otto Young, on behalf of the former Executive Committee, made a brief report. He said that copies of the Constitution and By-Laws, and invitations to join the Association had been mailed to 15,000 jewelers throughout the country. As yet they had received but a limited number of replies, but he anticipated that before the close of the year their membership would be five or six times what it was at present. Most of the replies which they had received were very complimentary to the organization, and only a few were anything like derogatory. 36 States and Territories were already represented in the membership of the Association, and that was more than most societies could show for an existence of only 75 days. He felt sure that they would gradually draw in a large proportion of the jobbers and manufacturers.

After the customary vote of thanks the meeting adjourned.

The Ninth Annual Banquet of the Chicago Jewelers' Association.



THE NINTH annual banquet of the Chicago Jewelers' Association was held at Kinsey's magnificent new establishment, on the evening of Thursday, Jan. 7. The banqueting hall was tastefully decorated with floral tracery and emblematic designs, and the members and their guests to the number of ninety, sat down to the most elaborate banquet which it has been the fortune of the Association to enjoy. F. E. Morse, President of the Chicago Jewelers' Association, occupied the chair, and among the guests and members present were E. Nelson Blake, President of the Board of Trade; ex-Gov. William Bross, Lyman J. Gage, Gen. I. N. Stiles, S. S. Gregory, Prof. Elias Colbert, Rev. Dr. Thomas, Rabbi Hirsch, Martin Ryerson, Joseph Fahys, New York; E. C. Fitch, Waltham, Mass.; Clemens Hellebush, President of the Cincinnati Jewelers' Association; S. H. Hale, New York; C. N. Thorpe, President of the Keystone Watch Case Company, Philadelphia; F. R. Appleton, New York; E. J. Scofield, New York; J. Bunn, Jr., and L. W. Arnold, Springfield, Ill.; E. A. Bliss, Providence, R. I.; I. Eisenstadt, St. Louis, Mo.; W. A. Moore, Newport, Ky.; T. M. Avery and J. M. Cutter, of the Elgin National Watch Co.; H. Cloudman, Elgin; W. F. Tompkins, of the Seth Thomas Clock Co.; T. Evans, of the Dueber Watch Case Mfg. Co.; John P. Owen and W. H. Allen, of Robbins & Appleton; H. S. Peck, of the Waterbury Clock Co.; H. F. Hahn, L. W. Flershem, H. M. Carle, Peter Lapp, Benj. Allen, Otto Young, Paul Juergens, S. Anderson, W. B. Clapp, Caleb Clapp, Thomas Davies, Z. Oppenheimer, E. V. Wendell, Thomas Cogswell, O. W. Wallis, C. H. Knights, R. N. Matson, A. L. Sercomb, of the Meriden Britannia Co.; M. C. Eppenstein, E. V. Roddin, Samuel Swartchild, John F. Morse, G. P. Titus, L. Manheimer, William M. Alister, W. N. Moore, Attorney of the Association; Abner Hurd, Lewis Bliss.

Letters of regret for inability to attend were received from August Kurtzeornb, of St. Louis; H. Olmstead, Secretary of the New York Jewelers' Association; Seth Thomas, of New York; and J. H. Welch, of Bristol, Conn.

After a sumptuous menu served in the best style, F. E. Morse, President of the Association, made the following opening remarks:

"In calling you to order I will first give assurance that my remarks will not detain you long, and they will relate entirely to a brief mention of our Association. Referring to the second clause of our articles of incorporation which reads about as follows: The particular business and object for which the Chicago Jewelers' Association is formed, is to cultivate friendly relations with each other, promote

the best interests of its members, to obtain and diffuse accurate and reliable information among its members as to the standing of merchants dealing in our various lines, etc. Grand objects are these, and they have served well in our experience to obliterate the abominable notion that traders have long had, that because engaged in a similar business they must be sworn enemies, and do all possible for each other's downfall. This magnificent spectacle before us to-night is one of the great objects fulfilled, but by no means would I have you believe that it is its greatest. Turning to our records I find testimony of its great usefulness. It has fixed and registered the credit of over 13,600 merchants dealing in our various wares scattered all over the country, and has reached outside to Canada, Mexico and British Columbia. Its correspondents are located wherever we wish to obtain reliable information. To show its increasing usefulness, the number of inquiries and reports in 1885 over those of 1884 were forty-nine per cent. For the last three months, as compared with the same months of 1884, the increase has been sixty-seven per cent. In a trade taking such important rank as the manufacturing and wholesale jewelry business of Chicago does, namely: Sales of upwards of \$13,000,000 in 1884, and some \$15,000,000 in 1885, did it not stand us well in hand to form the Chicago Jewelers' Association some nine years since? Most assuredly all safe merchants and business men will with us vote in the affirmative. Right here I wish to make an acknowledgement: We have been members of this Association about three years. Had we followed its warnings and relied upon no other information, where our losses have been thousands they, I dare say, would have been only hundreds. Yes, gentlemen, the Chicago Jewelers' Association has come to stay, and I warn all outsiders, be not deceived, but put your houses in order and knock for admission. I am gratified to note that on my right and left sit all our honored ex-Presidents. May they, with all our members, long live, for certainly in this institution all who had to do with its foundation and growth builded better than they knew."

Gen. I. N. Stiles, in responding to the toast "Our Nation, State and City," after amusing the guests with some humorous stories on the legal profession, to which he himself belongs, said that the American nation was a wonderful people. There never had been a people like us heretofore. This country of ours was but a little over a hundred years old. We were only cutting our teeth as a nation, and were not yet through with the measles, and mumps, and scarlet fever period of life. We were a great people and we knew it, but we were very like a young man full of promise, bright, active and self-reliant, who knew everything, who had nothing to learn, who could be told nothing. We stood off and admired his pluck, but said, "Young man you have much to learn yet." Other nations stood off and looked at us much the same way. We boasted of our freedom, and yet we were a nation of slaves subject to a commercial despotism. We complained of hard times and over-production, but what were we doing to induce other nations to purchase our stock of over-production? Last year we sold \$40,000,000 of manufactured articles, while England offset that with hundreds of millions.

After referring briefly to the State of Illinois, the speaker alluded to Chicago as a wonderful city in many respects, but deplored the low tone of morals that pervaded alike both parties and all classes of the people. There ought, he said, to be a party organized which should have for its object the purification of the city of Chicago. Something else ought to be found on which they could rest the glory of Chicago besides its stock yards, its Board of Trade, its well paved streets, its magnificent buildings, its water works and so on. The gamblers, professional thieves and bunco-steerers, and all the riff-raff, non-productive, parasitical crowd should either be compelled to follow some honest occupation or quit. All this could be accomplished if the people would only seriously and in dead earnest raise the demand for a better order of things. (Applause).

The Hon. William Bross, to whom was assigned the honor of replying for "The Ladies," after an eloquent and humorous apostrophe to the "objects of poetry and of love," concluded as follows:

"Gentlemen you are not expecting me to make a long speech on this subject. You know as well as I do that the poet has said:

'Oh, woman, in our hours of ease,
Uncertain, coy, and hard to please;
But seen too oft, familiar with her face,
We first endure, then pity, then embrace.' (Laughter).

But, gentlemen, you are here to-night to listen to a good many speeches, and I am here simply to answer to the toast to the ladies. I wish they were here to answer for themselves. (Applause). Then I know your eyes would sparkle in answer to the toast, and in answer to the sparkle of their eyes and the beauty which they would bestow upon you. Permit me to say that the only lady that I ever knew in my life who allowed herself to be cheated was about forty-six years ago. (Loud laughter and cheers).

The Rev. Dr. Thomas, in replying to the toast "Moral and Business Integrity," said he hardly knew why they should call upon a clergyman to respond to such a toast, as his profession did not know much about business, and not any too much about morals. (Laughter). There should have been a toast to compliment those who had gotten up and managed this excellent banquet. He had attended many banquets given by this Association, but this one excelled anything that they had before attempted. But to approach the subject of the toast, he would ask the question what are we all at work in this world for? One view of it was that we were working along on what Sir William Hamilton called "The Bread and Butter Argument," or what Emerson termed "The Go-Cart of Need and its Necessities." We were all working to bring to ourselves the mere necessities and comforts of life. But was all this amazing display of human energy, this outlay of human strength, this exhibition of human skill, all this vast business enterprise of our world only to this end? If so, it seemed a great expenditure for a very little result; for the powers that made and sustained the world and brought everything so near completion, could easily have added another leaf, and we could have been fed and clothed as God fed and clothed everything else. There must be something back of the old sand road—the Cemetery Ridge—that we were struggling for, and it had been indicated in the toast to which he had been asked to reply—"Moral and Business Integrity." All the vast transactional system of industry, of buying and selling, these multiplied divisions of labor, did not find their final cause in the mere results of what they did for us, but in the vast transactional system in which we were to work out a higher problem of moral and business integrity; in other words, God's indirect way of making men, or his method of putting us along a line of transactional industry where we might make ourselves. It took strength, persistence and long application to achieve success, and men were to be honored who could honorably fight and win. But the highest thing was that we make ourselves, that we work out this problem of moral and business integrity, that in this transactional scheme of things we develop the great equalities of virtue. Men in every walk of life were working out the same problem. Jewelers were working out that important phase of human nature, that necessity of our race, in ministering to the æsthetic tastes, to the sense of the beautiful, and teaching us by object lessons the value of that which is delicate, that which is artistic, that which is fine. (Applause).

E. Nelson Blake, President of the Board of Trade, in rising to reply to the toast "The Commerce of Our Country," expressed the pleasure which it gave him to be present, and his appreciation of the honor which the Association conferred on the great commercial body which he represented. He had no sympathy with what Chauncey M. Depew said some two years ago, that the falling off of the grain trade was all due to the operations of the Chicago gamblers in the Chicago wheat pits. He forgot that not only was there a falling off in the demand for wheat, but that when wheat sells in Liverpool at 31 shillings a quarter, so also does cotton sell at 5 pence, or 10 cents a pound, and that there was less demand for American petroleum in consequence of the supply from Russia. But to refer to the jewelry business, it always seemed strange to him that, sitting on their hard

benches, between their unpainted walls, on their uncarpeted floors, in rooms as plain as the architect could make them, they, of all others, should enjoy the reading of the old Hebrew poets, and that in their explanations of the beautiful they could read of the New Jerusalem, with its gates of pearl and its streets of gold. Surely there was something incongruous in that. They forgot that the most beautiful similes in that book they loved so well were rich and abundant in jewelry, and precious stones, and metals. When he came to the banquet he expected to see the programme full of beautiful subjects, and "yet I see you are the same hard, practical business men we are ourselves."

Mr. Blake then directed his attention to the cause of the decline in American commerce. Our shipping was at its height after the war in 1812, and right down to 1840. Then packets from Boston and New York used to make the passage to English ports in twelve or fourteen days. British ship owners could not compete, and so the Cunarders came in, backed by a government subsidy of first \$100,000 and then \$700,000. American ships then almost disappeared. Some said that the Anglo-American cruiser from 1860 to 1865 swept them away; but that was only one cause. Shorter routes, like the Suez Canal, the Panama Railroad, and our own Trans-Continental line had done away with the old sailing ships. Petroleum had done away with whale oil, Egypt was now producing cotton, and India and Australia were furnishing abundant supplies of wheat.

What then was the remedy for this decline of commerce? It was to produce and make a market at home. Wheat was gradually being driven farther West, but no nation could be great that was dependent on one staple—cotton or wool. Inter-State commerce and improved inland waterways were among the important problems to be worked out in the line of improved commerce. If we were to compete successfully with foreign nations in pouring our breadstuffs into the foreign markets, we must compete at home in producing. What we wanted was a larger home market and more manufacturers in this country. If he were a rich man he would be a free trader, and so could go into the market and buy at the cheapest prices; and if he had anything to sell he could sell it at the dearest. But the man who had his brains to sell or his labor, ought to be a protectionist, he granted, under a revised tariff. (Loud applause).

Lyman J. Gage, who replied for "Banking and Money," said that it was not often that the profession to which he belonged received so many kind words in given time as the chairman had heaped on him. It was true that they had frequent notices, and those who read the papers had observed in large block letters at the head of the column: "Full Account of the Cashier Skipped for Canada," or the lamentable fall of some bank president. They were accustomed to be called "monopolists," and "gold bugs," and the "embodiment of selfishness," and so it touched a tender spot when the Association gave to the profession to which he had the honor to belong its confidence and kindly notice.

Mr. Gage then related a story illustrative of the intricacies and minutiae of banking procedure, which was so intricate and involved in itself that most of the guests had lost the thread of the narrative ere it was half told. This was evidently Mr. Gage's intention, and the bewildered jewelers could only join with him in a hearty laugh.

Addressing himself to financial statistics, the speaker said that for the year ending June, 1884, products to the value of \$734,000,000 were brought into the United States; and there were shipped out of the United States to foreign ports products to the amount of \$667,000,000. There was shipped in money to pay for this importation of \$734,000,000, about \$69,000,000—a little less than 10 per cent. There was received in payment of the \$667,000,000 sent out something like \$37,000,000, or about five per cent. In other words, that vast trade was effected with the intervention of about seven and one-half per cent. of the money which the transactions involved. On the western frontier 75 per cent. or thereabouts of all the transactions of trade and commerce cleared themselves by the credit instruments which the banker uses and makes effective for that pur-

pose. In Chicago about 87½ per cent., and in New York about 92½ per cent. of all commercial transactions were closed in that way, while in London the figure was about 97 per cent., or only about three per cent. of actual cash passed in transactions.

As to money, the question of the future standard of value in the United States was of serious import to every business man. The question was whether we should voluntarily maintain the present advantageous standard of gold which brought us in perfect harmony with the world's settling house standard—London? Think as we might and talk as we might, the stern fact was that commerce and trade is determined in the London settling house, and we could not change it to-day, nor next week, nor next year, nor for ten years. And now it was proposed that we should blindfold our eyes and walk into an unknown and mysterious region which we know nothing about, or take such action as will precipitously land us there. "I only wish to give you my affirmation," said Mr. Gage in conclusion, "that in my opinion the voice and influence of every man should be upon the conservative side, and for maintaining of the gold standard."

The Rev. Dr. E. G. Hirsch, in addressing himself to the toast "Education," said: "This is a very appropriate subject to be discussed here among the jewelers, for in a symbol your craft tells us all what education must do for a man. There is the diamond; it sparkles after it is ground by the skillful hand. Before it has gone through that process it is dim and without luster. So is man. He is a diamond in the rough when he comes from the hand of nature; but what the grinding is for the diamond, that education is for the man; for every man carries within himself something which constitutes his own individuality. So education is the drawing out of what is in man—a drawing out of the individuality of the one that is to be educated. And if education is successful, man represents the movements of a watch. There is the law of co-ordination; the large wheels and the little wheels, the delicate pinions—they are all in place if the man is to tell correct time. The educated man is indeed a watch-man. But this is the difference which there is. The watch obeys mechanical laws. Man is not merely a mechanism, he has also a soul, and education to be complete must indeed take into account also the soul state and function.

"This again is brought to my mind by your profession. You have to refine the gold. That delicate process of refining the soul is also a part of education. You deal in things that remind man of a higher world. You represent the æsthetic element in man. Man alone in this wide world comes into this world incomplete and imperfect, and to make himself perfect is the grand object of education. Now, no man is perfect unless the sense of the beautiful is cultivated within him. We preachers sometimes talk against ornamentation, and the old Quakers and Puritans forgot the æsthetic elements in man and therefore lost their hold, their moral strength upon the coming world. Man needs ornamentation, for ornamentation is the acknowledgement that man, as he is by nature, is not perfect. He needs to beautify himself by means which he invents, but which nature does not give him.

"And here a third thing I am reminded of by your craft. Education is not complete unless also the hand is trained. You construct the watch, or at least the old watchmaker did. He had a delicate touch of hand, a security in its movements, which now perhaps merely the surgeon has. Every man should have his hand under such perfect control as your watchmaker has his. The watch teaches to us that education is not complete unless the hand, as well as the head and the soul, is trained.

"And finally comes a fourth thing in education which your profession symbolizes to the world—a sound moral judgment. You sell real diamonds, and would spurn to pass the sham for the real article. You see to it that gold is 18 karats, and you despise one of your craft who would palm off an inferior article for the true one. So men should be genuine diamonds and not sham; eighteen karats and not merely fourteen. And education—moral education—must

also bring this to pass. All the great questions which agitate our country are, after all, moral questions. Socialism and anarchy will never come if, in happy living, and in perfect balance, the law of justice obtains a moral law. We have political freedom, but we are not aware that freedom, morally speaking, requires a deep sense of responsibility. None of us in Chicago have shown that sense of moral courage, or else not merely our streets would be clean, but that nastiness and filth which is worse, and which defiles and disfigures our city, would be swept with the besom of public indignation if we had morality in our municipal affairs, and if we, as citizens, would go to the polls and vote with a moral purpose. (Cheers) Whom do we send to Congress? Men who have not learned the A B C of political economy; men who care more for public place than for the public weal; men that might go to school yet to learn those great truths of responsibility and duty which can only be proven by thorough study and not by clap-trap oratory. Your craft preaches both of moral truth and moral greatness. Yes, it even preaches religious education. Man needs, and like gold, has a certain amount of alloy. You cannot shape gold without the alloy; and man would be too soft, too good for this world without a certain proportion of alloy. But religion comes in to make that proportion a right one. Take religion away and the alloy will go on increasing until brazen presumption takes the place of the golden appropriateness of duty. When in all this broad land we have education, and not merely instruction, then indeed may we boast of its greatness, for then, and then alone, it will be a home for free men, intelligently trained, morally endowed with a soul-life blending into music and melody, and with religious aspirations to bring harmony out of clashing discord." (Prolonged applause).

Prof. Elias Coldert, of the Chicago *Tribune*, who replied for "The Press," called attention to the fact that there were only three timepieces in England when St. George was first formally recognized as its patron saint. Little more than six and a half centuries had elapsed since then, but what a mighty improvement had taken place in horology and its patronage since then. With regard to the first point he would cite the celebrated watch of Captain Cuttle, which Dickens tells us was "equalled by few and excelled by none," if put back half an hour every morning and about another quarter towards the afternoon. Also the timepiece by the aid of which a certain Celtic gentleman was enabled to declare confidently: "If the sun is not up over that hill in a minute and a half, bedad he'll be late." About a dozen years ago the assessors found nearly a hundred gold watches in Cook County alone, and he should think that by this time there must be at least a thousand in the whole State of Illinois, without counting those on sale by jewelers. (Laughter). And wonderful to relate there were now nearly as many newspapers. He suspected the parity of numbers would have to be accounted for, if at all, by the fact that one cannot very well read a paper without *watching* it rather closely. However that might be, the character of some of these publications was enough to suggest that their editors were not much larger mentally than was the bodily stature of the sailor who was found taking a comfortable nap on his *watch*. And there was still another point of similarity between them—both running on tick so long as they run at all. His only apology for the introduction of this chestnut, which was old enough to be wormy, lay in the fact that some splendid *movements* had been made at Worms. It was there that Luther finished his first reform movements, which included an *escapement* that was regarded by many as little short of miraculous. There was a close historical connection between the press and the timepiece. Galileo's famous observation of the swinging lamp in the Cathedral of Pisa, which he afterwards applied to clock work, and the establishment of the first regular weekly newspaper were almost synchronous. As they started nearly together so they had kept nearly even pace ever since. Every movement in the publication of a great daily newspaper must, perforce, be conducted with the precision of clock work and be regulated by it. The steady movement of the clock and the press was alike kept up night

after night, while the greater part of the world slept oblivious of the fact, but prepared to show astonishment as well as displeasure if either one failed in its work, even by the intermission of a single beat. As an astronomer who compared the clock beats with star transits, through alternations of heat and cold, with an extensive range of variations in the barometric pressure, while able to detect the existence of minute errors, he often caught himself wondering at the perfection of mechanism which could ensure their being so small. It was almost enough to tempt one to believe that the makers of timepieces had succeeded in abolishing the primeval curse—or at least that part of it which is supposed to give what some one of our philosophers had called the “natural cussedness” of everything that is made by man.

S. S. Gregory, President of the Iroquois Club, responded to the toast “Our Laws and their Administration.” He could hardly agree, he said, with some of the previous speakers, that it was the function of law to try to control the business of a nation. It was the object of law to secure all in their rights, while leaving each individual member of society to work out his own idea in his own way, and carry on his business without the interference of law, whether it were supposed to be in favor of, or in opposition to, one's business. He could hardly be of opinion that it was possible by legislation to impose taxes in such a way as to increase the wealth or prosperity of a country. It was not possible for a government in the exercise of its power to coin money, to give to a dollar in silver, so-called, the equal of $412\frac{1}{2}$ grains of silver, or any other commercial value, that which is really bad, and if it was worth but 80 cents it was impossible by fixing a government stamp upon a certain quantity of silver to give to that silver dollar the value of a dollar in gold, worth a hundred cents. In the administration of law there was much that might well and justly be criticised. Edmund Burke, in treating of this very question in one of his essays, placed its root in the inherent imperfections of all that is human. While lawyers and courts were especially charged with the administration of laws, the laws were enacted by the people, and all citizens should have a deep appreciation of the important part which they have to play also in their due administration. He did not believe that the United States was like the republics of Rome and Venice, destined to speedy decadence, but that in our institutions was to be found the ideal government, beyond which it could not be that the human mind could make much progress. (Applause).

C. N. Thorpe, President of the Keystone Watch Case Company, made an interesting and exhaustive reply to the toast “The Manufacturers.” Looking over the lives of manufacturers, said the speaker, one never came across any of them of whom it was not true that they hazard much, and though often censured, do great good by the application and direction of skill, in enhancing the value of nearly everything which we appreciate and enjoy in life. The general tendency, as shown by statistics, was the extinction of the smaller establishments, and the concentration into larger factories. The manufacturer, whether large or small, knew that danger lurks often in the least suspected places. A correct estimate of economic conditions, an understanding of the market for his specialty, the strength or weakness of his competitors, were considerations that must of necessity enter into his calculations. Even then his estimate of the situation sometimes miscarries. He may have manufactured in excess of the demand; stored up goods not immediately salable; and collections may have been slow. But he who was ever on the alert, who kept abreast of the times, who was quick to see the advantages of sensible innovation upon old and cumbrous processes, who pushed the introduction of his goods, and only claimed for them exactly what they were, would certainly memorize hazard in his undertakings.

It was to England's credit that she had fostered manufactures, and would it not be well for us to follow her example, and not only honor individual manufacturers, but encourage them as she does by extending foreign trade. England paid nearly \$2,000,000 as subsidies to

her steamship lines that carry her mails to China and the East Indies, markets that stand ready to-day to absorb the surplus product of our manufactories. A short time ago every manufacturer who had opened a trade with that great continent that lies in the Pacific south and west of us, was threatened with the possibility of having to send all his letters to England in order to get them to Australia, because our own country refused to pay one-quarter, or \$100,000 of the \$400,000 needed by the lines running from our western shores to New South Wales, when that country of less than 2,000,000 inhabitants would pay \$300,000 herself. When we had good consular agents, ships commanded by American sailors, men ever on the alert for the interest of their principals, then we would not have to say, as during the past dull years, that \$12,000,000 or \$13,000,000 worth of cotton goods make an overloaded market, and consequently shut up our mills, but we would share in the benefit which England derives from the export of \$400,000,000 of cotton goods annually.

The speaker then referred, in passing, to the pioneers of American manufactures in various lines, and continued as follows: “I believe the inner history of our own watch and jewelry business will reveal a noble purpose to do that which is right and honorable for honor's own sake. Never shall I forget the remark of the manufacturer of gold cases, while discussing the practice in former years of debasing the quality of gold, and the great improvement in that respect in recent years, when he said: ‘I had hard work to get the extra price necessary to make the improved quality, but at last my efforts were appreciated, and never since that time have I made a single case that will not assay full what it is stamped.’”

“Manufacturers could do good by building up industries in new places, and he should always have before him his responsibility as a brother to those who work for him, for upon him depends the fortunes and happiness of hundreds of his workmen.

“The era of large factories began about 1815, and within two generations saw the investment of \$30,000,000,000 in steam power. There is no doubt in my mind that we shall become the manufacturing country of the world.”

S. H. Hale, of New York, in response to the last toast of the evening, “Our Guests,” said: “I presume I am expected to speak for the Association and in honor of its guests. It was eminently true of all the guests that they had individually won distinguished rank by merits in their responsible callings and professions. Your President in his opening address came pretty near taking all my thunder away with his statistics of this Association. He failed, however, to say that the social part of it had grown far beyond the commercial. I remember the first banquet given by this Association. It was a pleasant one but very small. It was thought best to confine its entree to members of the Association, and a few merchants who were indirectly in the trade. But as years passed by they grew in their social ability more than 100 per cent., and this handsome entertainment to-night proves how great the growth has been, how open-hearted the jewelers of Chicago have become, and how thoroughly well appreciated they are by the eminent gentlemen who are here as guests to-night. I wish you all many happy returns of the evening, a growth in commercial standing as great as your growth has been in social, and with the best wishes of an old member of your Association, and as one still interested largely in your interests, I bid you all a happy good-night and many thanks for your kindness.”

The various speeches were interspersed with music, and the gathering broke up at an early hour, after having enjoyed an exceptionally pleasant social evening.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

The first month of the new year dawned upon the jewelers of

Chicago feeling better and more hopeful than they have done at any time in the last two years. The encouragement given by the unexpectedly brisk holiday trade raised hopes which have not in any way been disappointed by the results of the January trade. January is proverbially a dull month, when jobbers do not look for much business, and yet the experiences of the past month place it considerably ahead of the corresponding month of last year. The holiday trade came in a rush just before Christmas, and most jobbers found it from 25 to 50 per cent. in advance of what they had done during the holiday season of 1884. Of the packages sent out to retailers, infinitely fewer were returned than for a good many years past; and when it is taken into consideration that retailers generally disposed of a very large quantity of their old goods, it is evident that the trade must be in much better shape than for some time. Another important sign of returning prosperity is that collections have become much more prompt. An easier financial feeling exists, and confidence between jobber and retailer has been materially strengthened. The fact that values have reached rock-bottom, and the tendency towards stiffening of prices in certain lines of goods, are also pretty sure signs of better times. Travelers have been doing quite a brisk business all over the country filling up the gaps made in the retailers' stocks by the brisk holiday trade, and the general testimony is that the January trade has opened up much better than last year. Manufacturers, from present indications, are expecting an increase in business of 25 per cent. or more. But for the severe weather which has materially interfered with trade, January would have had a still better record than has fallen to its credit.

Most of the Western and Northern States have shared in the general briskening-up of business. Things have been somewhat dull in Southern Illinois owing to the killing of the wheat, but in West Virginia, where the crops were by no means good, jewelers did quite an active business. In some parts of Kansas a little dullness was experienced, but in the greater portion of that State, and all over Nebraska, quite a rushing business was done.

Jobbers generally are perfectly agreed that there has been a decided change for the better, but the extent to which this has been experienced by the leading jobbers, may perhaps be better realized from a few individual expressions of opinion. B. F. Norris, Alister & Co. state that trade is keeping well up, money coming in beyond their expectations, and orders increasing. They have generally found a good December to be followed by a good January, and this year their previous experience has been more than realized. C. H. Knights found his holiday trade about $33\frac{1}{3}$ per cent. ahead of last year, and reports collections as very good. Giles, Bro. & Co. think business very satisfactory in spite of the weather blockade. They estimate their holiday business to have been somewhere about 50 per cent. above that of last year. Benj. Allen had a very satisfactory holiday trade, and considers the business for January somewhat better than last year. His men on the road have done considerably better than last year, and report retailers as feeling greatly encouraged and very hopeful. Collections were showing a marked improvement, and altogether he believed the trade to be in much better shape than two years ago. He didn't look for any very great improvement this spring. If he did as well as last spring, or a trifle better, he would be well satisfied. Clapp & Davies report business considerably better than a year ago. They consider things to be looking better, and prospects to be much brighter than they have been for two years. The city trade had been a little dull, but making every allowance for the heavy storms, the country trade had been very fair. With Cogswell & Wallis business has been keeping up, and collections are satisfactory. Stein & Ellbogen find orders coming in better than last year from both country and city, and collections much more prompt. Samuel Swartchild and all others conversed with by your correspondent expressed the opinion that trade is in better shape than for several years, and that all indications point to a returning wave of prosperity.

Quite a number of small failures have occurred among retailers in

the West and Northwest, but they cut very little figure from a trade standpoint. These failures were largely confined to that class of retailers who, being nearly broken as it was, thought it good policy to order largely in view of the holiday trade, and so be able to fall with some money in their pockets.

The engrossing topic of conversation and comment among jobbers during the early part of the month was the sudden disappearance of J. S. Gratz, of the firm of J. S. Gratz & Co., 175 Madison street, after selling out his stock at a low figure to Adolph Shakman & Co. His stock, according to reports which are probably too high, was worth \$20,000, and this, together with some \$12,000 of book accounts, he sold to Shakman & Co. for \$9,000. The line of credit he worked up was reported to amount to about \$40,000, of which \$25,000 was in New York. These figures are also possibly exaggerated. Several of the New York creditors, suspecting that all was not right with Gratz, sent instructions to Chicago to have him investigated, and in case their suspicions were correct, to have him arrested on a charge of obtaining goods under false pretenses. The New York Jewelers' Board of Trade had also been investigating Gratz, and notified its members Dec. 21, to be careful in their dealings with his firm. Gratz, who succeeded to the business of Grundling & Schmidt, claimed that when he bought them out he gave \$15,000 in cash. The "Co." in his firm name was merely nominal, as he had no partner. Fred. W. Schmidt, however, was retained by him as an employé, and sent on the road to work up trade.

Jerome B. Chambers, the well-known retail jeweler, who for the last fifteen years has carried on business at the corner of Clark and Madison streets, died on the 15th of January, at his residence, No. 692 Washington boulevard. His disease was paralysis of the brain, brought on, it is believed, by a sunstroke received while visiting his old home at Sharan, Litchfield County, Conn., five years and a half ago. Mr. Chambers came to Chicago about 30 years ago, and after engaging in the auction and commission business, drifted into the regular jewelry trade. In his earlier life he was an ardent politician and was ever known as a man of the kindest impulses, and a steadfast friend. In the community in which he lived so long he bore a character for the strictest rectitude and business integrity. His funeral was attended by a large delegation of Chicago jewelers.

W. A. B.

Stretching Tool for Watch Wheels.

IN THE 3d edition of his *Manual for Watchmakers' Apprentices*, Hermann Sievert describes the following handy tool for stretching watch wheels:

No objection can be raised to the stretching of wheels, if performed in an intelligent manner; only it must not lead to a deformity of the teething. It generally suffices to stretch the teeth a little, whereby they become both longer and broader, so that with help of a suitable fraise well formed teeth, depthing sufficient deep, can be formed from them. Some repairers stretch the wheel with the hammer upon an ordinary anvil, and acquire a certain dexterity in it. Much practice is necessary for doing this, however, because if even one small place is struck with a corner of the hammer, the teeth on that particular spot become wider, and, of course, unequal.

For preventing such an occurrence, the stretching tool will be found very appropriate. Upon a piece of brass, to be fastened in the vise, is screwed a polished steel plate, which at certain distances is pierced with holes for receiving the pinions and arbors.

The wheel to be stretched is laid upon the plate, with pinion inserted through one of the holes, so that the teeth reach nearly to the front edge. While striking obliquely with the hammer face upon the teeth, and, if necessary, upon a part of the tooth rim, the wheel is from behind held fast and uniformly rotated by the left forefinger. In this manner the edge of the anvil will prevent any defective tap, and with a little practice the work will be performed so well that it

appears as if the wheel had been stretched all around by rollers, as the single hammer taps are not visible. As long as, in consequence of the oblique position of the hammer, a part of the wheel rim remains untouched, this is not stretched in its length, and the wheel does not become cornered. The polished side of the wheel naturally is laid face down, and if the plate of the stretching tool is well polished, the former will lose little of its good appearance.

The Jewelers' League.

Ninth Annual Meeting—Amendments to Constitution and By-Laws acted on.



THE NINTH annual meeting of the Jewelers' League was held at Masonic Temple, Tuesday evening, Jan. 19, President Hayes in the Chair. There was a full attendance, and deep interest manifested in the proceedings. The reading of the minutes of the last annual meeting having been printed and furnished the members, their reading was dispensed with. President Hayes read his annual address as follows:

ADDRESS OF PRESIDENT HAYES.

We assemble at this our ninth annual meeting gratified with the substantial condition of our institution, and hearty greetings may welcome the firm and advancing position of the League. Worthy of your entire confidence, it merits the increasing attention which it constantly obtains from the several persons engaged in the jewelry and kindred trades. I trust your deliberations this evening will be impartial and such as will tend to the increased security and greater usefulness of our association.

From the casual observations which I have been able to make, I feel satisfied that two important principles are requisite for the safe management of any desirable and durable plan of life insurance. These are a reserve fund to meet special emergencies, and a charge at least equal to the cost of insuring each person according to his age. Level assessments are attractive in theory, but entirely unjust to younger men, and certainly unsafe in practice. I therefore urge the necessity for adopting the plan proposed by amendment of Article V, regarding graded assessments. This would be adding a very positive security for permanence, and while it may not be as exact as a plan that would provide for "aging" and graded assessments, yet we will be safe in so amending our Constitution. I quote a short extract from a most able and convincing article on this subject by a very competent and experienced authority. He says:

"Candidates for membership find that because an association has not advanced its rates, assessments have to be made for *all* deaths as they occur, and because the old men are getting such a 'soft thing,' getting off by paying so much less than their proportion, they stick with wonderful tenacity, and the death rate is, perhaps, 15 out of each 1,000 members annually. Will these candidates come in? I think they will at least look around to see if they cannot do better. Suppose they do so and find another institution or plan where all pay according to age without regard to length of membership, and, by advancing the rates as members have grown older, a surplus has been and is being raised, which is used to pay off the surplus of deaths caused by the increasing age of members, and although the death rate is somewhat higher than at first, so many are paid from the treasury without assessment, that only about 9 are assessed for annually out of each 1,000 members, instead of 15 as in the other association. Which of these rival plans or institutions will be likely to get these candidates?"

With this quotation I leave this subject and call your attention to the proposed amendment to Article XII, Sec. 4, providing for quarterly dues, which shall increase the Contingent Fund, created for the purpose of paying death losses should the mortality exceed $1\frac{1}{4}$ per cent. annually. The adoption of the two aforesaid additions to our Constitution will prove elements of strength surpassing any safeguard that may have existed since our foundation.

The report of the Executive Committee will present the history and transactions of the past year in so comprehensive a manner that

I need not here refer to the low average cost per year, to our increased membership, or to the very slightly increased average age. But I desire to place on record my full appreciation of the labors of your Executive Committee. The members have been ready in season and out of season, early and late, at all times, without reward save that of a conscientious discharge of duty, regardless of self and comfort, to give unwearied hours, and closest attention to the work devolved upon them, which could not have been better done had we paid them fees equalled by the most lavish corporation; and you will do well to retain, if possible, their experience, prudence, ability and devotion for our future welfare; while the retention of men possessing such exceptionally high character will reflect the highest character on the already worthy reputation of the League. Any suggestions they may offer, or recommendations they may make, should receive our respectful and most careful consideration.

From the exceedingly able, comprehensive and intelligent report of the Secretary and Treasurer, you will have a panoramic view of our association in its every financial feature. I therefore refrain from attempting to gild refined gold, and beg leave to trespass on your time merely to say that in this office there is no need for Civil Service Reform, for here the place has sought the man and not the man the place, and where exactly the right man is in the right place you can never obtain my vote to displace so competent an official at the risk of acquiring inexperience and possible, nay probable, incompetency. Cheap labor for good work is the poorest sort of economy. I have not the slightest idea whether or not our Secretary wishes the position, but we ought not to permit ourselves to part with the attention so unselfishly given in the labors of past years, or the experience so well won.

Fellow members, during the past twelve months the Grim Visaged Monster perchance has crossed your thresholds and taken a jewel from the bright home circle, leaving a shadow at the fireside never to be effaced. But how much greater the desolation in those homes whence have been summoned by this Unconquered Conquerer fifteen of our comrades. At his bidding they passed into the unknown future, leaving an aching void, which has been partly solaced by the bright winged messenger from the League's treasury. If you would secure for those dependent on you thus much relief from care and such aid in times of helplessness, I appeal to the generous impulses of your higher nature to give impassioned consideration and cool thought to such legislation as will tend only to the perpetuity of our association, giving growing strength with advancing years, making perennial the life of the truest object of our care—The Jewelers' League.

Mr. J. C. Downing, Chairman of the Examining Finance Committee, reported that the printed report of the Secretary and Treasurer, as furnished the members, was accurate in every detail. On motion the reading of the report was dispensed with. A synopsis of it presents the following facts:

REPORT OF SECRETARY AND TREASURER.

| | |
|--|-------|
| Membership of League, January 20th, 1885..... | 2,962 |
| Applications received during the year 1885..... | 170 |
| Applications rejected " " " "..... | 14 |
| Applications referred for investigation, (not yet accepted)..... | 7 |
| | 21 |
| Members accepted during the year 1885..... | 149 |
| Members dropped, for non-payment of assessments..... | 120 |
| Members resigned..... | 15 |
| | 135 |
| Members reinstated, (who had been dropped in former years)..... | 47 |
| | 88 |
| Increase for the year 1885..... | 61 |
| Members died during the year 1885..... | 15 |
| | 46 |
| Net increase during the year 1885..... | 46 |
| Total Membership at date..... | 3,008 |
| Members died since organization, June, 1877..... | 63 |
| Members resigned " " " "..... | 30 |
| Members expelled " " " "..... | 1 |
| Members dropped " " " "..... | 557 |
| | 651 |
| Last Membership number..... | 3,659 |

| | GENERAL FUND. | BENEFIT FUND. |
|---|---------------|---------------|
| Amount on hand January 20th, 1885..... | \$2,704.53 | \$522.20 |
| Uninvested balance in Permanent Fund..... | 204.71 | |
| RECEIPTS. | | |
| 149 Members' Initiation Fees, at \$3.00..... | 447.00 | |
| 149 Members' First Assessments, at \$2.00..... | | 298.00 |
| Amount from Reinstatements..... | 4,142.00 | |
| Interest on Deposits at Union Trust Co., 1 per cent.... | 86.55 | |
| Interest on Contingent Fund, (4 per ct. Reg'd Gov. Bds) | 610.00 | |
| Interest on Permanent Fund, (6 per ct. City & Cnty Bds) | 210.00 | |
| Interest on Permanent Fund, \$50.4 per ct. Coupon Bond | 2.00 | |
| Assessments Numbers 46, 47 and 48..... | | 16,816.00 |
| “ “ 49 and 50..... | | 11,600.00 |
| “ “ 51, 52 and 53..... | | 16,296.00 |
| “ “ 54..... | | 5,628.00 |
| “ “ 55..... | | 5,778.00 |
| “ “ 56, 57 and 58..... | | 17,054.00 |
| “ “ 59 and 60..... | | 11,372.00 |
| Donation from JOHN C. DUEBER, (the unexpended balance of money subscribed for the sufferers by the Flood at Newport, Kentucky)..... | 2,360.72 | |
| Total amount to the credit of the Treasury... \$10,767.51 | | \$85,364.20 |

| DISBURSEMENTS. | | |
|--|-----------|-----------|
| Beneficiary of E. R. Glover, New York, N. Y. \$5,000.00 | | |
| “ A. M. Zahm, Lancaster, Pa..... | 5,000.00 | |
| “ G. A. Smith, Sac City, Iowa..... | 5,000.00 | |
| “ Frank Durand, New York City... 5,000.00 | | |
| “ G. A. Burns, “ “ ... 5,000.00 | | |
| “ Samuel Joel, “ “ ... 5,000.00 | | |
| “ Henry Klees, “ “ ... 5,000.00 | | |
| “ Werner Freese, Chicago, Ill . . . 5,000.00 | | |
| “ C. E. Rodgers, Ganonque, Canada. 5,000.00 | | |
| “ Francis Monk, Chicago, Ill..... 5,000.00 | | |
| “ N. F. Baldwin, St. Joseph, Mo.,. 5,000.00 | | |
| “ James C. Rich, Chicago, Ill..... 5,000.00 | | |
| “ C. H. Wiltberger, Washington, D.C. 5,000.00 | | |
| “ David S. Jones, Boston, Mass.... 5,000.00 | | |
| “ W. R. Sutherland, Kansas City, Mo 5,000.00 | | |
| Commissions of Secretary and Treasurer. . . | 4,242.10 | |
| Purchase of Bonds for the Contingent Fund, under the direction of the Board of Trustees..... | 6,078.40 | 85,320.50 |
| Amounts carried forward..... | 10,767.51 | 43.70 |

| MISCELLANEOUS DISBURSEMENTS. | | |
|--|------------|------------|
| Books, Stationery and Printing..... | \$1,020.39 | |
| Postage and Rent of Post Office Box 3,444.. | 427.68 | |
| Rent of Office..... | 400.00 | |
| Expense of Annual Meeting..... | 62.50 | |
| Fuel, Gas and Ice..... | 28.54 | |
| Office Expenses..... | 57.95 | |
| Services of Counsel of the League..... | 30.00 | |
| Rent of Box in Nassau Safe Deposit Vaults.. | 10.00 | |
| Testimonial to Ex-President G. T. Woglom.. | 36.75 | |
| Commissions of Secretary and Treasurer . . . | 229.45 | |
| Purchase of Bonds for Permanent Fund..... | 3,272.94 | |
| Purchase of Bonds for Contingent Fund under the direction of the Board of Trustees | 1,887.23 | \$7,463.43 |
| | | \$3,304.08 |
| | | \$3,347.78 |
| Chatham National Bank..... | 2,086.66 | |
| Cash on hand..... | 147.12 | |
| Uninvested Balance of Permanent Fund, Union Trust Company..... | 270.30 | |
| Uninvested Balance of Contingent Fund Union Trust Company..... | 800.00 | |
| Benefit Fund, Union Trust Company..... | 43.70 | \$3,347.78 |

| BOARD OF TRUSTEES IN ACCOUNT WITH JEWELERS' LEAGUE. | | |
|--|----------------------------|------------------------------|
| Balance reported January 20th, 1885 | Permanent Fund. \$4,783.82 | Contingent Fund. \$17,000.62 |
| PURCHASED DURING THE YEAR 1885. | | |
| \$6,500 4 per cent. Registered Gov't Bonds | | 7,965.63 |
| \$2,500 N. Y. City 5 per ct. Reg'd Gold Bonds (Par Value.) | 3,272.94 | 8,056.76 |
| Total Reserve on hand..... | | \$33,023.01 (Market Value.) |

WM. L. SEXTON,
Secretary and Treasurer.

| BOARD OF TRUSTEES IN ACCOUNT WITH JEWELERS' LEAGUE. | | | |
|---|---|--------|-------------|
| | | DR. | |
| March 14, '84. | General Fund Surplus... | | \$1,471.72 |
| “ “ | Benefit Fund “ | | 2,216.40 |
| May 17, '84. | General Fund, “ | | 61.09 |
| “ “ | Benefit Fund “ | | 2,134.20 |
| “ “ | Chicago Fire Fund, “ | | 4,938.53 |
| Sept. 29, '84. | Benefit Fund “ | | 4,800.00 |
| Jan. 7, '85. | Bond Donated and now transfer'd to Trustees | | 50.00 |
| “ 12, '85. | Benefit Fund, Surplus... | | 6,112.50 |
| June 5, '85. | Benefit Fund “ | | 3,040.63 |
| Jan. 7, '86. | Benefit Fund, “ | | 3,037.77 |
| “ “ | General Fund, “ | | 1,887.23 |
| “ “ | General Fund, “ | | 707.51 |
| “ “ | Newport, Kentucky, Flood Fund..... | | 2,360.72 |
| “ “ | Uninvested balance in Permanent Fund.... | 204.71 | \$33,023.01 |

| CR. | | | |
|----------------|---|----------|-------------|
| March 14, '84. | \$3,000 4 per ct. Reg'd Gov't Bonds | | \$3,688.12 |
| May 17, '84. | 2,000 4 per ct. “ “ | | 2,400.00 |
| “ “ | 3,500 N. Y. City & County 6 per cent. Bonds | | 4,733.82 |
| Sept. 29, '84. | 4,000 4 per ct. Reg'd Gov't Bonds | | 4,800.00 |
| Jan. 7, '85. | 50 4 per cent. Coupon Bond. | | 50.00 |
| Jan. 12, '85. | 5,000 4 per ct. Reg'd Gov't Bonds | | 6,112.50 |
| June 5, '85. | 2,500 “ “ | | 3,040.63 |
| Jan. 7, '86. | 2,500 N. Y. City 5 per ct. Gold Bonds..... | | 3,272.94 |
| “ “ | 4,000 4 per ct. Reg'd Gov't Bonds | 4,925.00 | 8,056.76 |
| | | | \$24,966.25 |
| | | | \$33,023.01 |

TRIAL BALANCE, January 19th, 1886.

| | | | |
|---------------------------------------|--------------|----------------------|--------------|
| Cash..... | \$3,347.78 | Initiation Fees..... | \$10,977.00 |
| Books, Stationery & Printing 5,120.15 | | Assessments..... | 300,342.00 |
| Post Office..... | 1,811.91 | Interest..... | 1,777.81 |
| Secretary and Treasurer... 15,887.25 | | Reinstatements..... | 5,740.00 |
| Rent..... | 1,324.50 | Donation..... | 7,349.25 |
| Attorney..... | 520.07 | | |
| Sundries..... | 609.83 | | |
| Beneficiaries..... | 263,670.10 | | |
| Office Furniture..... | 871.46 | | |
| Contingent Fund..... | 24,966.25 | | |
| Permanent Fund..... | 8,056.76 | | |
| | \$326,186.06 | | \$326,186.06 |

The whole amount collected since the League was organized, is..... \$326,186.06
Of this amount there has been paid to Beneficiaries, 81 per cent..... 263,670.10
“ “ “ “ invested for Contingencies, 11½ per ct. 37,242.25
“ “ “ “ paid for expenses of all kinds, 7½ per ct. 25,273.71

The report of the Executive Committee was read and accepted. It was as follows:

REPORT OF THE EXECUTIVE COMMITTEE.
Mr. President and Gentlemen of the Jewelers' League :

In presenting to you this our ninth annual report, we again congratulate you upon the success of this organization. Your Committee have held twelve regular and four special meetings. We now number 3,008 members, a net gain of 46 during the year, which, considering the depression of the times, we think augurs well for the League. We have prepared a more stringent form of application for membership, which requires the family history of the applicant, as well as a more thorough medical examination. The average age of membership is at the present time 38³/₁₀ years, a slight increase over the last report.

Through the exertions of Mr. John C. Dueber, of Newport, Ky., we have secured for the League the unexpended balance of the Cincinnati Relief Fund, that was subscribed by the jewelers, amounting to \$2,363.03, which amount has been invested in N. Y. City and County Bonds and placed in your Permanent Fund.

Our Reserve Fund has grown to some extent, but, gentlemen, not rapidly enough in our judgment; therefore the Committee, feeling it their duty to do all in their power to advance and strengthen the

League, have, after careful deliberation, offered certain amendments, which we trust will meet with your approval.

We wish to call the attention of the members to the necessity of remitting promptly upon receipt of an assessment notice, the 30 days being allowed only to cover any delays that might occur. If your remittance does not reach the Secretary at the end of the time allowed, your name is dropped from the roll of membership and cannot be replaced until the next meeting of the Executive Committee. In the meantime you are not a member and the Executive Committee would not have the power nor legal right to pay your beneficiary.

The League Surgeon has, as heretofore, been of great service to us in deciding upon applications. Thanks of the members are also due to the Trade Journals for their kind expressions.

A little exertion on the part of the members to increase our number would be of benefit to the League.

In closing our report we point with pride to the past record of the League and look to the future with confidence.

| | | |
|------------------|----------------------|------------------|
| HENRY HAYES, | } <i>Ex officio.</i> | GEO. R. HOWE, |
| JAS. P. SNOW, | | CHAS. G. LEWIS, |
| R. A. JOHNSON, | | S. H. HALE, |
| WM. C. KIMBALL, | | E. S. SMITH, |
| AUG. KURTZEBORN, | | JOHN R. GREASON, |
| | | J. B. BOWDEN, |
| | | <i>Chairman.</i> |

ELECTION OF OFFICERS.

The President announced that the next business in order was the election of officers in place of those whose terms of office have expired. The officers to be balloted for, he said, were President, Third and Fourth Vice-Presidents, Secretary and Treasurer, and three members of the Executive Committee. The retiring Vice-Presidents were Messrs. Snow and Johnson, and the retiring Committeemen Messrs. J. B. Bowden, George R. Howe, and C. G. Lewis. The President called Mr. Snow to the Chair, and he appointed as tellers Messrs. C. E. Settle, Henry Untermeyer, J. C. Mount, and S. B. Mann. Nominations for President being called for, Mr. E. S. Smith nominated Mr. Henry Hayes.

On motion the Secretary was instructed to cast one ballot for Mr. Hayes for President. This having been done, and Mr. Hayes declared elected, he resumed the Chair amid long continued applause.

THE PRESIDENT—Gentlemen, this is very flattering, and, I assure you, it is entirely undeserved and unwarranted. I again must have the liberty of saying that I do not thank you for placing me in this position. At the same time I certainly am not unmindful of the very elegant manner in which you have tendered me this nomination and have endorsed it.

You know I have not given much time to the specific duties of the League. I have attended a few of the meetings of the Executive Committee, sufficient to warrant my full endorsement of that Committee, and since my official connection with your organization I feel more and more the desirability and the importance of keeping its affairs in a staunch and flourishing condition. I will endeavor another year to serve you more fully than I have in the past year, and if you will elect some much better man next year you will suit me very much better, but, at the same time, I will try and do my duty now that I am in the Chair, and if I err it shall be only through ignorance and not from design. I ask your support and your confidence in this meeting, and will only say that with such an assemblage of men we cannot expect anything but the most courteous treatment and the wisest legislation. (Applause).

The Third and Fourth Vice-Presidents, namely, Mr. Kimball and Mr. Kurtzeborn, become the First and Second Vice-Presidents. Therefore the nomination of a Third and of a Fourth Vice-President is now in order.

MR. T. W. MANCHESTER—I nominate Mr. R. A. Johnson as Third Vice-President.

MR. B. W. ELLISON—Mr. President I rise to second the nomina-

tion of Mr. Johnson. Mr. Johnson has been an officer of the League from its first inception. He is now lying ill at his house, and if he was here to-night he would not find as many friends as he would after the votes were counted. I hope, sir, while he is convalescing, we may be able to carry the glad news to him to-night that he has been thought well of by the League and has been elected Third Vice-President.

There being no other nominations, the Secretary was instructed to cast one ballot for Mr. Johnson, which being done he was declared unanimously elected Third Vice-President.

Mr. G. T. Woglom, ex-President, read a short letter received by him that afternoon from Mr. Johnson in which he says: "I feel that the destiny of the League depends upon its management for the next year or two. As our good ship sails on through the channel we can all see more rocks than when we started on our voyage. I have confidence that we shall reach the open sea, but now we want steady men at the helm." His words were received with applause.

Mr. Theodore Parker nominated Mr. James P. Snow for Fourth Vice-President, and he was unanimously elected in the manner the others had been.

In response to a general demand, ex-President Woglom and the newly elected Vice-Presidents took seats on the platform.

Mr. William L. Sexton was then unanimously elected Secretary and Treasurer, and, in response to the applause with which he was greeted, returned thanks as follows:

MR. SECRETARY—Gentlemen, I was notified, or rather it was intimated to me that at this, the annual love feast of the Jewelers' League, some of the dishes were to be very cold. I am sure that if this dish, your reception of this nomination, is a cold one, I pity the members who have in store the warm or hot dishes of the feast. (Laughter.)

I wish to make one personal remark. I suppose you call this an ovation. The President did not know what to call it. If it is an ovation, I thank you for it.

It is very pleasant for one in a position of this kind to look into the faces of such an intelligent audience and be able to count his friends by the score, and it is still more gratifying to know that this friendship is enhanced by your confidence and respect. I am sure that you have had every aggravation to treat me otherwise, after having placed me here five terms in succession, and having borne with assessment after assessment (of course under the direction of the Executive Committee) and the fact that you are still willing to place me here again is a mark of your respect, esteem and confidence, and I accept it as such. But back of that, gentlemen, there is no doubt in my mind that your enthusiasm and the reception which you accord to all of the officers is a mark of your devotion to the Jewelers' League, and it shows that your devotion to the League and the principles upon which it is founded is greater than your love of money.

It will interest you to know in connection with the work of the League, that during the past week the accounts and records and the affairs of the League have been thoroughly inspected by the examiners of the Insurance Department of the State of New York. They came without warning and they made a thorough and systematic examination. Without being egotistical and in the absence of a certificate which has not yet arrived from the State Department, I can say that they have expressed entire satisfaction with the affairs of the League up to date, and they made the remark that they "would not care to see a more complete set of accounts than we have in the Jewelers' League." I know that you take pride in what belongs to you, and as the affairs of the League belong to you I therefore knew that you would be interested in knowing this fact.

Thanking you gentlemen again for your kindness, I shall endeavor to serve you in the future as faithfully as I have in the past. (Applause.)

Nominations were then made for members of the Executive Committee, which resulted in the election of Messrs. J. B. Bowden, Charles G. Lewis, and George R. Howe.

MR. WOGLOM—Mr. President, during the time that I had the honor of presiding over the business of the Jewelers' League it never was my good fortune to have sit with me, as I presided, any of the Officers of the League, and I think it is a gratifying evidence at this time to know that the presiding officer has succeeded in having them come upon the platform with him. (Laughter).

Now, in retaliation, I propose that the President call to the platform the members of the Executive Committee who have been elected.

THE PRESIDENT—I will ask the members of the Executive Committee to take seats on the platform. Gentlemen, there is no necessity of your having a photographic likeness of this assemblage, (laughter) they are here before you and I am very glad to say that they are together once a month on business that comes up for their consideration, and a better looking set of men you cannot find. (Applause).

MR. UNTERMEYER—We ought to have their pictures in *The World* to-morrow.

THE PRESIDENT—The next business is the consideration of the amendments to our Constitution, which has been proposed. Motions are in order.

MR. KIMBALL—Gentlemen of the Jewelers' League, I have been rather unexpectedly called upon to-night to present to you and advocate the amendments to the Constitution which have been suggested by a Sub-Committee of the Executive Committee.

Some two years ago I had the pleasure of requesting you gentlemen to make some amendments to the Constitution which should establish a Contingent Fund. We presented those amendments to you, I am free to confess, with a great deal of fear and trembling, but when the vote was announced on them we found that the members of the League were nearly unanimous in supporting those amendments, and, as a result of our changes at that time, we have accumulated a fund of some \$30,000.

Gentlemen, the amendments we propose this evening have in view the increasing of this fund, and the same arguments which were used two years ago in regard to them will apply to-night. Your Executive Committee, and I think every officer of this institution, feels that it is to your interest that our fund should be increased much faster than it has been. We have done excellent work. \$30,000 or \$33,000 is a large amount of money, but \$33,000 distributed among 3,000 members is not so much money.

Now the changes which we propose to make to-night are that persons joining this League who are over thirty years of age shall pay a little more money than those who have joined in times past. The advance is very small, and, gentlemen, I can assure you that if the officers of this League were to do their work over again, if we were to go back eight and one-half years, we should propose a scale of prices which would be similar to the ones which we propose to-night, which is in the interest of every member of this League.

Now I wish, gentlemen, that you would fully understand that the scale of prices which we propose here to-night does not interest or rather effect any member of this League. It is only on those *new* members who are to come in after this date. As you will see by referring to the proposed changes here, those over 30 are to pay \$2.50, those from 35 to 40, \$3.00, those from 40 to 45, \$4.00. Your Committee have given this matter very careful consideration. They have consulted reports of other organizations, and they feel, gentlemen, that it is for your interest entirely that we should make these changes. The money which we receive is placed on deposit—invested in Government Bonds, and it is only used as provided for in the Constitution—"whenever our assessment exceeds $1\frac{1}{4}$ per cent. of the membership." Gentlemen, I hope that you all fully realize that we have given this matter careful consideration, with the view of having this League last so that you and I, and all the rest of us, who are members of this institution, whose life may be prolonged, (and I hope it may be for a great many years) will be able to derive the advantages which the institution was created to accomplish. I

hope, gentlemen, that you will, this evening, make a unanimous vote for the accumulation of this fund as you did two years ago.

Mr. President, with these few remarks, I would move you, sir, that Article II, Section 4, of the Constitution be amended to read as follows: "All applications for membership must be accompanied by three dollars as an initiation fee, and the amount of the first assessment, as provided for in Art. V, Sec. 4, which fees will be returned to the applicant if the application is rejected."

This amendment, you will understand, is necessary to make the scale of prices as proposed.

THE PRESIDENT—The motion is made and is before you. Are there any remarks? There do not seem to be any. Are you ready for the question?

A vote was then taken on the proposed amendment just read, and the amendment was carried unanimously.

MR. KIMBALL—Mr. President and gentlemen, the next measure proposed is simply for the changing of Article IV, Section 2, so that the Finance Committee when they are looking over the books of the Secretary and Treasurer can look over *all* the funds. Our Constitution, as it read before, simply said "the Permanent Fund." Now, the change that we make here is simply to substitute the word "all." It is an amendment that I presume the gentlemen will not object to. It is simply to allow the Examining Committee to examine the entire finances of the institution. I move you that Article IV, Section 2, be amended so as to read as follows: "The President shall, at each annual meeting, appoint three members of the League (not members of the Executive Committee) as an Examining Finance Committee, who shall make an examination of the books, accounts and vouchers of the Treasurer, and of the securities and investments of *all funds* in the keeping of the Executive Committee, and report upon the same at the next annual meeting." This merely substitutes the word "all" for the word "permanent."

Motion seconded and the amendment was adopted.

MR. KIMBALL—Mr. President and gentlemen, the amendment to Article V, Section 3, is the first of a series of amendments which proposes a quarterly assessment of one dollar. Institutions of our character, the constitutions of which we consulted when this organization was formed, did not have this assessment of one dollar in them, but they, like ourselves, have increased in knowledge on this point, and, so far as I know, every institution of a character similar to ours has changed its constitution so as to make this quarterly assessment of one dollar. All for the purpose of increasing the Contingent Fund.

Gentlemen, I will not occupy your time by telling you how a Sound steamer might go down, and how the Astor House might burn up, or the Palmer House might burn up, or something of that sort happen, and this association be called upon to make an assessment of \$40, \$50 or \$60. You have had all that talked to you in the last four or five years; but, gentlemen, there is no question in the minds of every officer of this institution but that it is of the highest importance that we should have a fund so that whenever it becomes necessary for us to order a large assessment, or when there are a large number of death losses it is all important that we should have a fund that we could resort to and find the money there applicable to an assessment.

The Commercial Travelers' Association, of Syracuse, which association we have followed to a great extent, has adopted this means of accumulating a fund. In one year they withdrew from their Contingent Fund the sum of \$45,000. To-day they have something like \$130,000 or \$140,000 in their Contingent Fund. The Mercantile Benefit Association, of this city, of which quite a large number of you are members, has already a fund of over \$130,000.

Now, gentlemen, I can simply say to you this: That the success of our institution depends upon our having a fund—a good sized fund. We number to-day 3,008 members. We have \$30,000 in a Permanent Fund; our liabilities are fifteen million dollars, and we ask you that you will adopt the amendment which is proposed here

to-night, and in that way help this fund in order that we may get up to \$100,000 or \$200,000, and in order to accomplish that object I would move you, Mr. President, that we add to Article V, Section 3, as follows: "Any member who shall not pay the annual dues provided for in Article XII, Section 3, within 30 days after the ordering of assessments next following these dates, viz.: January 1st, April 1st, July 1st and October 1st, of each and every year, shall be stricken from the roll, in the same manner and under the same provision as in Section 2 of this Article."

Motion seconded.

MR. MANN—Mr. President, I move as an amendment to that, that a quarterly assessment of 50 cents be made, and I do it for the reason that our members, those who we want to bring into our League and to keep in our League, are members who sometimes find it hard to pay even that one dollar, and particularly after the year the jewelry business has had, and, for that reason, I would urge the members to make it 50 cents, because we can at any time raise it up to one dollar if the majority of the League chooses to do so. When you figure that the men who are working for nine dollars, and ten dollars, and eleven dollars a week, you must remember that it comes a great deal harder for them to pay one dollar out of that amount than it would be for some men of the League to pay \$500. For the reasons which I have suggested I urge my amendment.

The amendment offered by Mr. Mann was declared out of order.

The proposed amendment was discussed at length and amid much interest by Messrs. Parker, Frank, Barnett, McKinney, Woglom, Crommelin, Strauss and others. Finally a vote was called, but so much confusion prevailed that a rising vote could not be counted. The house was then divided, the "ayes" taking one side and the "noes" the other. A count revealed 212 members voting, 123 in the affirmative and 89 in the negative. The amendment was declared lost, a two-thirds vote in the affirmative being necessary to carry it.

Mr. Kimball presented the next amendment, which proposed to change Article XII, Section 4, to read as follows: "The Contingent Fund shall be increased by imposing on and collecting from each and every member of the League an annual due of four dollars, payable quarterly in advance."

This was also discussed vigorously and at great length, Mr. Woglom advocating it in earnest terms in a forcible address. He was ably supported by the President, who took the floor and contented that something of this kind to increase the Reserve Fund was absolutely necessary to perpetuate the League. Several other members spoke in favor of the amendment, and others opposed it with equal earnestness and vigor. On the vote being taken 206 members voted, 127 in the affirmative and 79 in the negative. Two-thirds being required, it was declared lost by eleven votes.

The next amendment, which was adopted, fixed assessments on new members as follows: from 21 to 30 years of age \$2.00; from 30 to 35 years, \$2.50; 35 to 40, \$3.00; 40 to 45, \$4.00.

MR. KIMBALL—Gentlemen, we have one more amendment. It is as follows:

"Article VI, Section 1, to read as follows: The amount arising from the payment, by each admitted member, of his first assessment, together with the assessment ordered by the Executive Committee upon each other member, shall be placed in a trust company as a special deposit. Upon satisfactory proof of the death of any member of the League, the Committee shall pay this amount so collected (less 5 per cent.), not exceeding \$2 for each member, and in no case exceeding \$5,000 to the person or persons whose name shall, at the time of the death of such member, be found recorded as his last designated beneficiaries, or in case of their death to their legal representatives, and the receipt of the proper party in either case shall be conclusive and final except when such member shall have in his last will and testament left the amount to other parties than the ones designated on the books of the League, and legal notice of the probate of such will shall have been served upon the Secretary of the League before the payment of the loss shall have been made.

Immediately after having ordered the payment of a death, the Executive Committee shall order another assessment upon each member to be used in like manner. Whenever the amount in this special deposit exceeds the sum of five thousand dollars, the excess shall be transferred to the Contingent Fund."

That means if we take these people in, under graded assessments, for instance, a man between 40 and 45 years of age would pay \$4, but only \$2 of that money goes to the beneficiary and the other two dollars goes to the Contingent Fund. That is to carry out the principle that we thought it advisable to pass.

The amendment was then adopted.

An amendment to the By-Laws was adopted, fixing the limit of the medical examination fee at \$3, all examinations to be made by a physician approved by the League, where possible, in preference to a family physician.

Mr. Hale then moved to amend Article II, Section 2, as follows:

"Any man of good moral character and good general health, not over 40 nor under 21 years of age, who is now or has been for one year prior to the date of his application, engaged in the jewelry or kindred trades, is eligible to membership in this League."

Mr. Hale made a lengthy appeal in favor of his amendment, claiming it to be necessary to reduce the average age of the membership.

On being seconded by Mr. Frank it was adopted. This rendered it necessary to amend the amendment fixing the assessment rate between ages 40 and 45 at \$4.00 by omitting it altogether, which was adopted.

The proposed amendment to Article XIII relative to sending out notices and voting by proxy was taken up, and, after discussion, was rejected.

Mr. Woglom asked unanimous consent to offer an amendment fixing annual dues at \$2.00 in place of the \$4.00 amendment just voted down, but objection was made and his amendment was not received.

The amendment fixing the compensation of the Secretary at \$3,500 per annum was next considered, but after considerable discussion was indefinitely postponed.

The President then appointed the following named gentlemen as the Examining and Finance Committee: Mr. G. H. Houghton, of the Gorham Manufacturing Company; Mr. G. M. Van Deventer, of the Waterbury Clock Company; and Mr. M. J. Lissauer, of Lissauer & Sondheim.

Adjourned.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

THE trade during the holiday season convinced both manufacturers and retail dealers that the people must have something unique in way of personal adornments. The more peculiar the article and less like that belonging to somebody else, the better pleased is the purchaser. The day for prescribed rules governing the shade and make of milady's dress or the size and shape of her brooch is past. More individuality is expressed in dress to-day by American women than ever before in the history of this country. Ladies are wearing what they believe is becoming to their own special style and what they personally admire.

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THIS tendency on the part of the ladies to dress as they please gives wide license to manufacturers who are no longer afraid of presenting a novelty lest it will be repelled because not in fashion, for it

is hardly possible at the present time for any thing that is artistically beautiful to be out of style. Proofs of this statement are to be found in every respectable retail dealer's show cases. This diversity of styles pertains not only to jewelry and silverware, but to dress fabrics and their trimmings. Ask any reputable dry goods merchant what is the fashionable material and color for a lady's gown, and he will reply by pointing to the weaves from looms of a dozen countries, and expressing every hue in the rainbow.

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THIS lack of prescribed rules in fashion is a fortunate thing for jewelers and silversmiths in more ways than one. One important result is the impossibility of any one style possessing real merit going out of fashion in one or even two seasons any more than one certain style can obtain absolute sway in one season. New things find favor gradually, just as old ones, in the nature of things, slowly and almost imperceptibly slip away and are finally seen no more. It is the exception now-a-days that any one style has what is called a "run" to the exclusion of all other fashions. Silversmiths do not have often repeated the experience that hammered ware brought them.

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MANUFACTURERS who had new things to offer or attractive lines of staple articles experienced a largely increased holiday trade over that of the corresponding season of 1884, and are in consequence encouraged to prepare unusually large and full lines of goods for the spring trade. New goods this season, both in gold and silver, mean for the most part new styles of finish and ornamentation rather than absolutely new articles. The Queen chain may be cited in illustration. It is no longer new, and yet it presents a decidedly novel appearance with the beautiful locket and other charms that have been attached to it in place of the original ball and cube.

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AMONG recent innovations that met with hearty approval and wide patronage during the holiday season and likely to prove popular for a long time to come, is the new industry of the application of silver to natural buckhorn, wood and glass without the aid of other metals. By this application is obtained a silver surface susceptible of a great variety as regards finish, inexpensive, comparatively speaking, and durable. The cane heads, umbrella handles and carving sets representing silver on buckhorn have already gained a wide circulation, and the same is true of the vinaigrettes and liquor flasks of glass with artistic silver coverings. The application of silver on wood is attractively represented in bon-bon boxes, hair and clothes brush handles, and the articles employing silver in their manufacture. Those bon-bon boxes, by the by, it is thought by city dealers, will prove very acceptable at Easter when novelties in this line are eagerly sought after. It is likely, too, that the silver comfit boxes, already described in THE CIRCULAR, will also find an increased patronage on the approach of Easter. Retail dealers in localities where this festival is observed will do well to pick up some of these pretty things. A little later on there will be silver eggs that on opening in half will disclose a jewel case or a work box.

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AMONG new things in silver jewelry offered by American manufacturers to the spring trade, are bracelets composed of twisted wire links; these are decided novelties. A very pretty pattern is that of silver wires braided. A braided bracelet seen was of bright finish, with antique coins attached as pendants. There appears to be quite a disposition to assimilate the bright and oxidized finish in some such manner. Another illustration is that of a bright silver wire bracelet with a bright silver cube in which antique medallions

are set in each side for a pendant. Appearing with new goods are the silver spring bracelets showing nugget finish. For children a popular bracelet is a plain band of silver with a little screw fastening. Many of the bracelets, by the way, are so arranged that these can be linked together and form a necklace.

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QUITE new in silver belts are flexible ones composed of three rows of coins. Some of these show the nugget finish, while others have plain surfaces; all are beautiful, and afford a pretty finish for the elaborate wash dresses which leading modistes assert will be largely worn again at country resorts next summer.

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EXCEEDINGLY appropriate for summer wear, because of its delicate, airy appearance, is fine filigree jewelry. Some recently imported bracelets and necklaces seen afford a charming illustration. These are composed of square silver links of fine filigree that make a frosted cobweb collarette and bracelets suited to association with fine lawns and laces. The neck pins, as usual, include all sorts of musical instruments, gondolas, pea pods and the like. There are also some very attractive parasol patterns, representing a parasol shut, half open and full spread.

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AS is well known to most of THE CIRCULAR'S readers, there is some very fine filigree made in this country; filigree which not only is beautiful in appearance but of enduring quality. The objection urged against silver filigree, that it tarnishes readily, is, in point of fact, no obstacle at all, because it can, in the hands of any expert, be brought back, not only to its normal color, but made to appear quite new again and at a trifling expense.

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NOVELTIES in filigree are oxidized filigree and gold plate on silver filigree. These styles are especially adapted to people who object to filigree because of its disposition to tarnish. The lace pins, in filigree, by the by, show insect and flower patterns and come with ear rings to match.

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Artistic novelties are oxidized silver watch cases simulating a sea shell. Little silver boxing gloves, of the pattern most approved by athletes, afford a novel match safe for gentlemen, and a vinaigrette holder for ladies.

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AS WAS predicted when the Queen chain made its appearance, it has called into fashion little locket and an infinite variety of charms of every description. As many as three charms are seen on some of the Queens, each charm hanging from a tiny short chain fastened in the ring at the terminus of the main chain. The lockets are quite small and richly carved; sometimes a number of gems are imbedded in the surface; again only one appears in the center. An attractive pattern is that which forms in chasing a tiny wreath of gold leaves with small diamonds and rubies to represent the flowers. Antique vases and jars in Roman gold afford attractive charms; so do braided gold baskets filled with enameled flowers. Tiny vinaigrettes continue popular, and balls and cubes made rich with gems remain in style. There exists not a doubt but that the Queen chain has come to stay indefinitely, and before the season is over it is likely to have found a welcome from Maine to Texas. The fact that this chain admits of great diversity of ornamentation is greatly in its favor, in this day and generation when women demand novelty even in their personal

adornment. This renders it practicable not only for every lady in the land to have a chain unlike her neighbors, but also to change the character and appearance of this same chain when weary of its original style, by substituting a new charm or charms, the pendant being the conspicuous part of the article.

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BROOCHES are all the while increasing in favor, but, as was intimated last month, these new pins do not appear to affect the popularity of the bar pin. Indeed, the bar pin, like the Queen chain, is susceptible of so many varieties that it cannot grow old. The new bar pins out for the spring trade are, many of them, exceedingly attractive. A large headed gold pin with an ornament set in the center represents one of the very popular styles. Often the effect is that of the ornament being pierced by the pin. This is especially the case with the insect designs, when a spider, a lady bug or a fly appears as if impaled on the pin. Gold swords with pearl or diamond hilts is another pleasing device. Sometimes the ornament to these pins is a single stone without apparent setting, such as a diamond, a sapphire or a pearl; again, it may be a ruby heart, a turquoise forget-me-not or a trefoil of three colored stones. Very pretty are the knife edge pins set with the smallest of diamonds or pearls; again, there appears a single row of stones of differing colors.

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A UNIQUE round pin is a circlet of gold with an open center, the circlet being wrapped round by an enameled ribbon dotted with tiny pearls. An irregular cobweb of gold threads, with a jeweled spider and fly in its webs, constitutes a brooch that takes well. The single flower pins with a gem in the center continue in favor; so do the insect pins. The horse shoe, crescent and star are popular forms for short pins where gems are employed.

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THE double bow pins which first gained favor in Paris, and which were introduced here in gold, are now made in silver; the surface being finished with enamel and different colored gold to simulate figured ribbons. Some of the newer of these pins show in the center a gem that represents a scarf pin thrust in the ribbon.

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THERE are, of course, many trinkets made to order that are never exactly duplicated, but a description of which affords a hint to a clever manufacturer who does not of necessity copy it, but work out on the suggestion a second novelty. A pendant recently made for a New York young lady, had set in its octagonal gold frame work nine small crosses of little diamonds, each cross being set so as to revolve at the action of some watch work mechanism at the back of the pendant, which arrangement naturally increased the play of light and brilliancy from the stones. An equally fine effect could doubtless have been produced, and at a greatly decreased cost, by the employment of the new iridium pivot, which was described in full in a former issue of THE CIRCULAR. And this calls to mind the fact that during the holiday season was seen not only solitaire ear rings in this pivot setting, but single stones in scarf pins, in brooches and in studs. The sensitive scintillating motion imparted to a gem thus set, not only enhances its brilliancy and apparent size, but insures absolute security from loss by wear. In a word, the most precious of gems can be worn pendant without fear of their dropping from their setting, a feature that the possessors of fine stones can hardly fail to appreciate.

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A LEADING daily journal assures its gentle readers that "gloves

with evening toilets are very long and bracelets are worn over them." This same journal less than six months ago asserted that "bracelets were not worn by ladies of fashion, being considered a vulgar style." Since the publication of the first statement the fashion reporter of said journal has doubtless been to the opera. The bracelet is one of the best selling in the trade, and the styles represented in gold, silver, onyx and gems are simply bewildering. Strangely enough the old spring bracelet holds its own with all the new comers, and the same may truly be said of *porte bonheur* bracelets. The flexible link and chain bracelets are also counted with good styles. The elastic reversible bracelet, consisting of little square sections strung on gold wire, have been christened by an up-town house that is doing a fine trade in them "Indian bracelets." By whatever name these bracelets are introduced it is prophesied they will find numerous admirers, for they are a decided novelty as well as an attractive ornament.

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AT a leading up-town house was seen not long ago, with a number of other beautiful and expensive articles that had been made to order, a gold bouquet holder. This sight recalled the time when every lady in society was the owner of at least one bouquet holder, and the question naturally arose, "Why are not bouquet holders in use now?" The answer comes from several directions that flowers are worn, not carried. And still the question may be with perfect propriety repeated. Flowers confined to the dress corsage wither before an evening is half spent, and on most fabrics leave their impress in an unsightly stain. Flowers carried in a suitable holder not only outlive the festivity for which they were culled, but may be held without fear of leaving the slightest blemish on the delicate buff and French gray gloves now worn.

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A SILVER holder seen at a well known manufacturer of fine goods last week, gave an exceedingly convenient receptacle for flowers, in addition to being a very beautiful ornament. It was of fine filigree work, with a handle convenient to grasp, which handle, however, could be spread out to form a standard, that, in the twinkling of an eye, converted it into a vase. In addition to this combination handle was a silver chain and ring attached. The holder could therefore be carried in the hand or dropped and swung from the chain, or set upon a table or stand as the lady found convenient. The Princess of Wales has set some very sensible fashions, and perhaps it may please her fancy some of these days to revive the bouquet holder. She has in her possession a beautiful specimen with which to make such revival, it being none less than the gift of the Lady Mayoress of Liverpool on the occasion of the Princess' marriage. This royal bouquet holder is rich with diamonds and pearls, and the wonder is that it has been suffered to be hid from sight for so long a time.

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RETAIL houses catering to a fashionable clientele, are showing thus early buttons for gentlemen's summer vests. These come in sets of four, this number being all that will be required for the low cut style that is to prevail. There are gold buttons of medium size with slightly rounding and carved surface; buttons with a gem set in the center, and white pearl buttons with gold centers. This really looks as if the free license granted by Dame Fashion for wearing jewelry again was not confined strictly to the ladies.

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ANOTHER new feature in jewelry for gentlemen are sets consisting of four shirt studs instead of three. These studs may be small diamonds set so as to show no gold; moonstones without apparent setting; pearls or the white linen enamel. Jewelers are meeting with much success with moonstones, set not only in studs, but sleeve

buttons and scarf pins for gentlemen. Scarf pins do not appear to have suffered any diminution in number or variety of styles, judging from the stocks on hand at all the leading manufacturers and dealers. A new pattern is a diamond interrogation point, which might suggest when worn by some the query "what is it?"

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TIME was when dudes and watch chains were not a permissible association in evening dress, but lo, a change has been wrought, and now is to be seen what is vulgarly called a "dog chain," running from the waistband into the trousers pocket. Ordinary dudes are contented with one chain, but "*la da dah*" dudes wear two, one of which must be silver with a small silver or nickel watch attached; this decorates the right hand pocket of the trousers, while a gold chain trims the other. This second chain does service as a chatelaine, there being attached to it a jewel, a knife, a buttoner, etc., etc., all of which, of course, are concealed in the depths of the trouser's pocket. This style is thoroughly English, "don't you know," and therefore will run until something more English, "don't you know," is telephoned over.

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THERE are gentlemen of the conservative class who, when they lay aside their ordinary watch chain, substitute a plain black silk chain with a dress suit. Of course, when the dudes are absolutely certain that this fashion was really set by the Prince of Wales, why, the dog chains will have to go. At the present writing there is some doubt as to its origin. There are also to be seen little chains of black silk ribbon, quite narrow and only long enough to serve the purpose of pulling the watch from the pocket. These simple affairs are decorated with tiny gold slides.

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COMPARATIVELY little is written about children's fashions in jewelry, and doubtless there are many conservative people who do not know of any other present in precious metal to give a baby than the old time silver cup. While silver cups have by no means gone out of date, there are many equally appropriate articles for very young folks, such as a silver porridge bowl and spoon with nursery rhymes illustrated thereon; gold and jeweled dress buttons; enameled nursery pins, apostle spoons, etc., etc. For boys come sets of buttons for shirt waists, also sleeve buttons, and then there is a big assortment of watches and chains made especially for juveniles. For little girls the collection is even more extended, and includes bracelets, pins and ear rings.

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A RECENT introduction in silver is another spoon pattern, the "New King's." This pattern is, in point of fact, an exact copy of the popular old English king's pattern, so largely affected by a certain class of customers, and heretofore imported for their benefit. This pattern, as many of THE CIRCULAR'S readers may know, is of the solid, heavy, elegant type, enduring as the hills, and affording decided contrast to most styles of spoon patterns heretofore made in this country.

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THE wearing qualities of the silver plate made now-a-days by trustworthy firms is acknowledged and appreciated by a large and respectable patronage. This patronage is further encouraged to use silver plate by the artistic designs and fine ornamentation employed which lifts plate goods to a higher plane than ever before attained. That there is a great satisfaction in the possession of sterling ware no one disputes, but then, everybody cannot afford the luxury of solid silver, and it is a pleasure to know that in fine plate ware such people can find an excellent substitute.

ELSIE BEE.

Trade Gossip.

The office of Elbe & Klinkowstein was slightly damaged by fire Jan. 6.

Mr. A. W. Kipling, of E. E. & A. W. Kipling, sailed for Europe Jan. 16.

Mr. Sim Jacobs will represent A. Pinover & Co. as traveler for them this season.

The new No. 4 movement of the Illinois Watch Co. is meeting with very gratifying success.

Mr. Charles Darling, formerly with Charles S. Pine & Co., is now traveling for L. W. Pierce & Co.

Mr. Mortimer L. Strasburger has been admitted as a partner in the firm of Louis Strasburger & Co.

The annual meeting of the Northwestern Traveling Men's Association was held in Chicago Dec. 29.

The annual meeting of the National Association of Jobbers will be held in this city Tuesday, Feb. 9.

The firm of Friedenthal & Rypinski has been dissolved, and Herman Rypinski will continue the business.

Mr. S. H. Joseph, formerly with Max Freund & Co., will represent Albert Lorsch & Co. in the West this season.

Mr. Jo. Pforzheimer, formerly with L. Herzog & Co., will in future represent Ingomar Goldsmith & Co. on the road.

The firm of Kahn, Hanover & Co. has been dissolved by expiration. B. Kahn & Son will continue the business.

Mr. Frank W. Harmon will represent Bryant & Bentley this season in the territory heretofore covered by Mr. L. P. Nichols.

Mr. Adolph R. Hutten, formerly with E. Aug. Neresheimer & Co., has made an engagement with Veuve L. B. Citroen & Co.

Mr. James Fricker, of Danville, Va., was the recipient of a fine portrait of himself as a Christmas present from his employees.

E. A. Phelps will continue the business of Phelps & Miller, San Francisco, Cal., under the same style of firm name as formerly.

Joseph S. Gratz, of Chicago, charged with unlawfully obtaining \$20,000 worth of jewelry, has been arrested in San Antonio, Tex.

Mr. Asa Richmond, who has for some time represented the firm of Richmond & Co. in this city, has become a partner in the firm.

Burglars robbed the store of Mr. E. D. Horn, Lima, Ohio, New Year's night, of about \$5,000 worth of diamonds and gold goods.

Mr. J. H. Rubens, for the past nine years associated with D. & M. Weil, will this season travel in the West in the interest of Jacob Strauss.

The United States Marble Clock Co., of Cincinnati, are producing some very attractive goods in style and finish, being equal to the imported.

Mr. Wm. F. McDonough has engaged with B. S. Freeman & Co., and will hereafter represent them on the road. He was formerly with Rothschild Bros.

The firm of J. & T. Marx, of Central City, Colorado, has been dissolved, Joseph Marx continuing the business under the firm name of Joseph Marx & Co.

Mr. W. H. Thornton, who for many years represented Rogers & Bro in the West and Southwest, will this year represent Kremenz & Co. in the same territory.

Mr. W. E. Walton, of Richmond, Mich., has recently occupied his new store in that city, and his establishment is declared to be the handsomest in that section of the country.

Mr. Thomas W. Manchester, well known in the trade, will visit his old friends in the interests of S. K. Merrill & Co., having engaged to travel for them during the present year.

Leverett S. Lewis, who has for two years past had charge of the diamond department of Wheeler, Parsons & Hayes, will continue in the trade with the firm of Smith & Knapp.

G. & H. Fox, of Fox Bros. & Co., Cincinnati, Ohio, left for Europe in the steamer *Fulda* January 20. They will be gone about three months visiting the diamond markets.

Mr. W. P. Stowe represents in this city J. B. Richardson & Co., of Providence, and W. H. Wilmarth, of Attleboro. Mr. Stowe was formerly with the Plainville Stock Company.

Mr. C. A. Gallagher, after having been absent from New York about a year, has returned to the employ of Sinnock & Sherrill, and will visit Philadelphia and Boston in their interest.

Joseph Fahys & Co. announce that their new atlas coin watch case is ready for the trade in hunting and open face, both key and stem wind. It is made in regular style with an extra heavy back.

Announcement is made by Carter, Sloan & Co. that Mr. Wm. T. Carter was admitted as a member of the firm on the first of the year, and also that Mr. Wm. T. Gough has been given an interest in the business.

The store of J. W. Ruth & Son, Shelbyville, Tenn., was destroyed by fire Dec. 23. Much of the stock was hurriedly removed, suffering some damage in the operation. The damage is mostly covered by insurance.

The Courvoisier-Wilcox Manufacturing Company, the Hampden Watch Company, and the E. Howard Watch and Clock Company have become tenants of the Knapp building, No. 41 and 43 Maiden Lane, within the past month.

Mr. Louis Kahn, of the firm of L. & M. Kahn, was recently presented by the employees of the firm with an elegant leather and walnut office chair. It was an acceptable and timely gift, and one of which the recipient is justly proud.

Mr. W. D. McVitty, for some time a traveler for a New York house, has recently purchased a half interest in the business of C. L. Merry, at Norwalk, Ohio. The firm will be known as Merry & McVitty, and will carry a full line of watches and jewelry.

Attention is directed to the advertisement of the Spencer Optical Company in this issue of THE CIRCULAR. This is one of the oldest houses in the optical line, is enterprising and progressive, and is constantly introducing novelties and new designs in their goods.

W. H. Dougherty, formerly with D. F. Conover & Co., Phila., has made an engagement with the E. Howard Watch & Clock Co. to travel in their interest. This company have opened their new office at No. 170 State street, Chicago, where they are now ready for business.

Mr. Veit Hirsh and Mr. Martin Metzger have formed a co-partnership under the firm name of Hirsh & Metzger, for the transaction of the business of manufacturing and selling jewelry. Their offices are at No. 173 Broadway, where they exhibit a full line of American watches and jewelry.

Simpson, Hall, Miller & Co.'s new catalogue for 1886 is now out. It contains handsome illustrations of their new designs in silver plated ware, and is elaborately gotten up and printed in the highest style of the art. This catalogue can be obtained by members of the trade on application.

E. A. Lauten & Co., manufacturers of jewelry cases, sustained a loss estimated at \$14,500, by a fire that occurred in Great Jones street, in the building occupied by them. The fire originated in the premises of another tenant, and the aggregate loss was extensive. Lauten & Co. were insured for \$8,750.

The officers elected at the annual meeting of the Cincinnati Wholesale Jewelers' Association, held Jan. 11, are as follows: Clemens Hellebush, President; W. Oskamp, Vice-President; Charles A. Nolting, Secretary; and David Schroeder, Treasurer. These officers, and Charles A. Duhme, compose the Board of Directors.

Some time ago a gentleman in a wholesale house during a busy day, picked up from the floor an unset diamond of considerable value. It had probably been dropped by one of his customers, and he confidently expected inquiries to be made for it. As yet none have been made, and the gentleman still holds it for identification.

The firm of Wm. A. Sturdy & Co. has been dissolved, and the firm of Engley, Wetherell & Co. has been formed to continue the business. The members of the new firm are William A. Engley, George L. Wetherell and Frank P. Barney, the first and last named having heretofore been connected with W. H. Wilmarth & Co., of Attleboro.

Messrs. Jacot, Juillerat & Co., of 37 Maiden Lane, have just received the musical boxes which received the principal prizes at the exhibition in Antwerp. Intending purchasers should not miss the chance of thus acquiring an instrument which has been pronounced first-rate. These boxes are of different grades and sizes, and the prices are absolutely the same as though they had not been prize takers.

In April last a thief named Harry Schindler made a bold attempt to rob the jewelry store of T. & E. Dickinson, of Buffalo. While looking at some jewelry, he suddenly seized the tray and rushed to the street pursued by Mr. Dickinson, who pressed him so hard that he dropped the tray to secure his own escape. Last fall he was arrested in Detroit, taken to Buffalo, tried and sentenced to five years in State Prison.

We are called upon to chronicle this month an unusually large number of robberies of jewelry establishments which indicates that the thieves consider the jewelry stores "ripe" about holiday time, and use every endeavor to secure plunder during the winter months. The Jewelers' Security Alliance offers the best protection against robbery that can be obtained, and every jeweler in the country should avail himself of it.

Buyers from the various important houses at present in Europe for the purpose of purchasing diamonds for the spring trade, report a strong market and higher prices. Mr. August Oppenheimer, of the firm of Oppenheimer Bros & Veith, returned from abroad the beginning of January after making large and advantageous purchases. Being early in the market he was enabled to take advantage of the prices of that date.

Messrs. Albert Berger & Co., of 47 Maiden Lane, have received from the New Orleans Exhibition the show case of Walter Berger & Co., which contained the samples of all kinds of watch glasses ever manufactured, as well as spectacle lenses in immense profusion, making, as opticians often remarked, one of the most interesting displays of the exhibition. The case, just as it stood in New Orleans, will now be retained at 47 Maiden Lane.

The annual "silver opening" of the Gorham Manufacturing Company took place Jan. 17, and continued two weeks. This is their special exhibit of art productions in silver whereat are displayed the finest pieces of workmanship in their vast collection, many of them being taken from their spring productions and being entirely new to the trade. These exhibitions attract large crowds of interested spectators, including many members of the trade.

The annual meeting of the New York Jewelers' Board of Trade was held at their rooms Monday, January 25. A very satisfactory report of the work of the year was read by Mr. J. R. D. Graham, the Secretary, showing the collection of a large amount of information of great value to the members. The following named gentlemen were elected directors for the present year: Joseph Fahys, S. Oppenheimer, F. H. Richardson, William Smith, J. W. J. Pierson, Leopold Stern, L. Strasburger, S. Lorsch, Louis Kahn, E. J. Schofield, W. F. Wilson, D. Untermeyer and Wm. Bardel. The officers are: Joseph Fahys, President; S. Oppenheimer, First Vice-President; F. H. Richardson, Second Vice-President; Wm. Smith, Treasurer. The organization now numbers one hundred members.

The regular meeting of the Safety Fund Society was held Jan. 13, on which occasion the report of the Secretary and Treasurer was read. It showed the affairs of the Society to be in a satisfactory condition. The following named gentlemen were elected directors: Enos Richardson, Henry Randel, Ira Goddard, Samuel W. Saxton, James C. Aikin, Samuel C. Scott, Charles G. Alford, William R. Alling, Frederick S. Douglas, S. Oppenheimer and Henry Hayes.

L. A. Cuppia, 19 Union Square, has ready for the spring trade cane heads, umbrella handles, carving sets and other articles made by the new process of applying silver to natural buckhorn, wood and glass. These goods attracted much attention during the holidays and are worth investigating. The trade will also be interested in the new link bracelets of this manufacturer's own make, as well as in a recent importation of silver filigree jewelry including several quite new designs.

The new firm of Ben. Spier & Co., located at 41 and 43 Maiden Lane, is composed of Ben. Spier and J. J. Cohen. Their offices in the Knapp building are handsomely fitted up, and a choice line of diamond and gold jewelry will be found there at all times. Mr. Spier has been a traveler in the trade for many years, and is well and favorably known throughout a large section of the country. Mr. Cohen, who is already in business in the same building, will continue in charge of that as heretofore.

The United States Government have now on trial a number of chronometers from the different makers, with a view to purchasing the best instruments for its use. The chronometers are to be thoroughly tested for six months, and prizes are to be awarded for the best, \$350 being the first prize and \$300 the second, and so on. Mr. H. H. Heinrich, of 18 John street, informs us that he has sent seven for competition, one of which has a balance made of palladium instead of steel. We shall let our readers know the results of the tests.

The Pearl Shell Co., of Lower California, composed of H. Levi-son, of the California Jewelry Co., Juan Hidalgo, and Marmiano F. Valdooinos, have obtained another concession from the Mexican government for pearl and shell fishing between Mazatlan and the boundary of Guatemala, for a period of 16 years. This, with their former privileges, gives them the exclusive monopoly from the mouth of the Colorado River to the line of Central America, a distance of 3,400 miles. The offices are, Herman Levison, Hamburg, Germany; Pearl Shell Co., 134 Sutter street, San Francisco; Cabezud & Co., La Pay, Lower Cal.

A dispatch from Chicago dated January 20, says that a daring robbery was committed at Severin & Brothers' retail jewelry store, at No. 775 West Madison street. Henry Severin, one of the firm, was in the store alone when four men entered and asked permission to look at a tray of plated lockets. He took the tray out of the show case and placed it before them, and they began a close inspection of its contents. Soon one of the quartet moved toward the end of the case and beckoned Severin to follow him. The young man thinking that he wanted to inspect some more jewelry, stepped to the end of the case. Before he had time to say a word he was grasped by the throat and the muzzles of two revolvers were pressed against his head. One of the men threatened to blow out his brains if he uttered a sound. While these two were paying their respects to the jeweler, their companions were at work emptying the show case of its stock of gold watches, rings and jewelry. They put everything into a small bag which one of the men held in his hands. Notwithstanding their haste, they selected nothing but the most valuable jewelry. Finally the man with the bag signalled his companions that they had enough, and three of them hastened out of the store, while the fourth remained to cover their retreat, which he did by keeping his pistol pointed at Severin. Finally he, too, made good his escape. No trace of the thieves has been discovered. The loss will aggregate \$1,500.

It is announced that the New Haven Watch Company has been transferred to Trenton parties, and the name changed to the Trenton Watch Company. The capital has been increased to \$200,000, and a large factory is to be built at Trenton during the spring. The following named gentlemen constitute the board of officers and directors: A. Carter, President; W. F. Van Camp, Secretary; L. J. Mulford, Treasurer. Directors, J. Hart Brewer, W. F. Van Camp, Jonathan Steward, David Taylor, Wm. A. Ensign, L. J. Mulford and A. Carter.

Two thieves named Charles Strauss and William Gregory were arrested last month for swindling jewelers in Newark. They were subsequently identified by Mr. C. J. Southerland, a salesman in the store of C. G. Rochat & Co., of Jersey City. Strauss and Gregory came into the store of Rochat & Co. some time ago and examined several trays of diamond rings, but went away without making a purchase. While Southerland was replacing the trays in the show case he saw that a ring valued at \$84 had been taken and a cheap imitation diamond ring substituted. A number of burglar's tools were in the room occupied by Strauss. The prisoners were held for examination.

A meeting of the retail jewelers of Pittsburg was held in that city Jan. 15, about fifty being in attendance. The object of the meeting was to devise means by which the wholesalers or jobbers could be compelled to cease selling to the public and thus ruin the business of the retailer. Mr. J. Reed, President, and Mr. C. C. Will officiated as Secretary. After the chair stated the object of the conclave, remarks were made charging the jobbers with openly selling to all who might call to purchase, and thus cutting the throats, so to speak, of the retailers, to whom alone the wholesaler is supposed to look for patronage. After considerable discussion, a committee was appointed to formulate a plan for organizing a permanent association of retail dealers of Pennsylvania, Eastern Ohio and West Virginia for defensive and offensive warfare, if necessary, against the abuses complained of. Jobbers were invited to be present at the meeting, and those who attended admitted the practice of selling to outsiders, but denied that it was carried to the extent asserted.

On January 13 a sub-committee of the National Association of Jobbers in American watches had arranged to hold a meeting in Cincinnati. The Wholesale Jewelers' Association of that city took advantage of the presence of the committee to hold their annual banquet on that date. Messrs. D. Schroeder, of D. Schroeder & Co., and A. Schwab were appointed a committee to make the necessary arrangements. This being done, the Association and its guests sat down to an elegant banquet at the Burnet House; Mr. Clemens Hellebush presided. The following named gentlemen were present and partook of the feast, which was prepared in Zimmerman's best style: Herman Duhme, Sr., C. Hellebush, C. H. Duhme, Clemens Oskamp, Will. Oskamp, A. G. Schwab, M. Schwab, D. Schroeder, S. Amberg, L. Gutman, A. Plaut, Charles Stern, John H. Voss, A. M. Plaut, S. M. Peck, Henry Hahn, Charles Nolting, John Dollar, W. C. Cook, T. W. Zimmerman, Fred. Phillips, W. A. Moore, Robert Waupel, Abe Steinau, Geo. H. Bishop, W. C. Kimball, of H. F. Barrows & Co., New York; J. Fuller, of Howard & Son, New York; J. C. Dueber, Newport, Ky.; T. M. Avery, Chicago, President Elgin National Watch Company; John M. Cutter, Elgin National Watch Company; Joseph Fahys, Joseph Fahys & Co., New York; C. N. Thorpe, C. N. Thorpe & Co., Philadelphia; C. M. Fogg, C. N. Thorpe & Co., Philadelphia; Otto Young, Blauer Watch Case Company, Chicago; F. R. Appleton, S. H. Hale and E. C. Fitch, of the American Watch Company; and C. F. Morrill, Bay State Watch Case Company, Boston. Toasts and responses followed the introduction of the cigars, among the speakers being Messrs. C. Hellebush, Herman Duhme, T. Zimmerman, Mayor F. R. Appleton; T. M. Avery, Joseph Fahys, Otto Young, C. N. Thorpe, S. H. Hale, W. A. Moore, J. M. Cutter and John C. Dueber.



VOLUME XVII

NEW YORK, MARCH, 1886.

No. 2.

THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 42 Nassau Street, New York.

Advertising rates made known on application.

The Commercial Travelers' License Laws.

THE FACT that certain States have enacted laws imposing a special tax in the shape of a license fee upon commercial travelers, has long been felt to constitute a serious grievance and an obstruction to unrestricted inter-State commerce that should be removed. The various organizations of commercial travelers have been striving for years to have these laws repealed, and recently appealed to Congress to enact a law prohibiting the States from enforcing such laws. In noting this fact in our issue for February, we stated that the bill had been introduced, but was not likely to meet favorable consideration, for the substantial reason that Congress has no right to interfere with State legislation. States have as much right to legislate upon any subject as Congress has; the action of all legislative bodies, however, to be valid must be within the limits prescribed by the Constitution; their action, that of Congress as well as of State legislatures, is subject to review by the courts, and, if it exceeds the constitutional limitations, it is invalid and of no effect. But unconstitutional laws are frequently enforced for years because no judicial decision has been rendered regarding them, or because the persons interested have not seen fit to test them in the courts. This is the case with the commercial travelers' license laws; it was a long time before they were passed upon by the Supreme Court of the United States, and even then the decision declaring them to be unconstitutional was ignored, the several States continuing to collect the license simply because it was easier for commercial travelers to pay it than to contest the law. As the subject is one of importance

to all branches of business, and is likely to occupy considerable attention for some time to come, a brief review of the situation will not be out of place.

The Constitution of the United States provides that "Congress shall have power to regulate commerce among the several States;" also that "the citizens of each State shall be entitled to all the privileges and immunities of citizens of the several States." The courts have enforced this latter provision in relation to this very question of the legality of the commercial travelers' tax laws. In the case of *Ward vs. Maryland*, the United States Supreme Court declared to be unconstitutional the law of Maryland that imposed a differential tax upon non-resident traders. Under the statutes, the highest license fee exacted of a resident was \$150, while non-resident traders were charged double this amount. Ward was a citizen of New Jersey, but sold goods in Baltimore without taking out a license. He was indicted, pleaded the unconstitutionality of the law, and, for the purpose of making a test case, a fine of \$400 was imposed upon him. The Maryland Court of Appeals affirmed this decision, and the case was taken to the United States Supreme Court. This court decided the law to be unconstitutional, reversing the judgment of the lower court on the following grounds:

Inasmuch as the Constitution provides that the citizens of each State shall be entitled to all privileges and immunities of citizens in the several States, it follows that the defendant might lawfully sell, or offer or expose for sale, any goods which the permanent residents of the State might sell, or offer or expose for sale, in that district, without being subjected to any higher tax or excise than that exacted by law of such permanent residents.

Justice Bradley gave a separate opinion, in which he declared that the Maryland act was

In violation of the commercial clause of the Constitution, which confers upon Congress the power to regulate commerce among the several States; and it would be so, although it imposed upon residents the same burden for selling goods by sample as is imposed on non-residents.

The question of the validity of the Tennessee law imposing a tax of \$15 upon "all peddlers of sewing machines and selling by sample," was held by the same court to be valid, because no discrimination was made between resident and non-resident "peddlers." The court said:

In all cases to which the one before us belongs, it is a test question whether there is any discrimination in favor of the State or of the citizens of the State which enacted the law. Wherever there is such discrimination it is fatal. Other considerations may lead to the same result. In the case before us the statute in question, as construed by the Supreme Court of the State, makes no such discrimination. It applies alike to sewing machines manufactured in the State and out of it. The exaction is not an unusual or unreasonable one. The State putting all such machines upon the same footing with respect to the tax complained of, had an unquestionable right to impose the burden.

In the case of *Walling vs. the State of Michigan*, the Supreme Court of the United States in January last handed down a decision re-affirming its decision in the Maryland case, and declaring the Michigan law to be unconstitutional because it discriminated against non-residents. It is only this discriminating feature of these State license laws, it will be seen, that has been declared unconstitutional;

the right of a State to impose license fees as a source of revenue is conceded, provided such fees are made uniform, bearing equally upon residents and non-residents. Upon this point Justice Field said :

The general power of the State to impose taxes in the way of licenses upon all pursuits and occupations within its limits is admitted, but, like all other powers, must be exercised in subordination to the requirements of the Federal Constitution. Where the business or occupation consists in the sale of goods, the license tax required for its pursuit is in effect a tax upon the goods themselves. If such a tax be within the power of the State to levy, it matters not whether it be raised directly from the goods, or indirectly from them through the license to the dealer; but, if such tax conflict with any power vested in Congress by the Constitution of the United States, it will not be any the less invalid because enforced through the form of a personal license.

The Supreme Court having thus repeatedly declared that any law imposing differential taxes is unconstitutional, it would seem to be an act of supererogation on the part of Congress to legislate against them. It is probable, however, that in some of the States where these laws exist, attempts will still be made to collect the fees prescribed from commercial travelers. The proper way to meet such attempts is to carry each case into court, and to prosecute for false imprisonment every officer who makes an arrest. The several travelers' associations should conduct these cases, and let it be understood by all travelers that they will assume all responsibility for resisting these unlawful proceedings. Let these associations protect their members in this respect as the Jewelers' Alliance protects its members from robbery, by following the thieves to the bitter end. It will require but a few prosecutions for false arrest and imprisonment to convince all policemen, constables and magistrates that they are personally liable for any attempt to enforce a statute that has been declared by the highest judicial authority to be unconstitutional. The travelers' associations can accomplish more practical good for their members, and for the employers of those members, by preparing to resist the execution of these obnoxious State laws by lawful means, than they can by importuning Congress to pass a law that would, in all probability, be unconstitutional if passed.

Congress and the Requirements of Commerce.



CONGRESS has been in session now for three months, and up to the present time has taken no action upon any of the great questions that are of vital importance to commercial interests. There has been considerable talk about remodeling the tariff laws; the question as to whether the silver coinage law shall be repealed or not has received more or less attention; while the national bankruptcy bill has received some mention; but upon no one of these important issues has definite action been taken in Congress. Nor has there been such debates upon them as would convey an intimation of what probable action will be taken eventually. Upon the silver coinage question, petitions for and against the repeal of the coinage act have been submitted to the committee having the subject in charge, and if any credence can be placed upon the numerous interviews with public men, the indications are that the silver mine owners of the West will be successful in defeating the movement for the repeal of the silver coinage act, and that, consequently, the government will go on buying up \$2,000,000 a month of silver and coining it into silver dollars. It is possible, however, that they will concede so much to the advocates of honest money as to improve the quality of the silver dollars to be coined, and instead of continuing to make debased dollars worth eighty cents each, the government will be authorized to make them worth 100 cents each. Should this be done, it will involve the melting up and re-coining of over \$200,000,000 of the debased coin now stored in the Treasury vaults. While it seems doubtful of securing the adoption of the gold standard

for our currency at this session of Congress, a great point will have been gained if the silver dollar can be made an honest one.

The question is one of such magnitude and importance that all sections of the country have become interested, and the sections are pitted one against the other on the issue, according as their local interests are supposed to be affected by the production or non-production of silver. The advocates of silver currency claim that the movement to demonetize silver is in the interests of eastern money lenders and opposed to those of the borrowers of the West, and those who have the products of the western silver mines to sell. The poor man, the mechanic and laborer, comes in for his share of political sympathy, and, strangely enough, each party to the silver issue claims to be his special friend. One side will not consent to compel him to accept an eighty cent dollar for a hundred cents worth of labor, and the other will not consent to his being taxed to pay in gold the national obligations that only call for payment in the currency of 1870, whether gold or silver. One party claims that the public faith is broken if national obligations, issued when gold was the recognized standard, are to be paid in silver, and the other party protests against paying gold for anything that can be purchased with silver. Practically for commercial purposes, it matters little what the circulating medium may be, provided it is made redeemable in honest gold coin worth 100 cents on the dollar. If the lawful circulating medium be silver, lead or leather, only a certain amount can be absorbed in commercial transactions, and if the issue can at will be transformed into gold, the currency becomes an honest one. What the public does not want is a depreciated currency, liable to fluctuations in value, with all its mischievous effects on trade and wrongs inflicted upon contracting parties. If the silver dollar, worth only eighty cents, is to be forced upon the public by the government at 100 cents valuation, it is evident that the people are being taxed to make a market for the products of the silver mines of the West. The question is not so much, at present, the demonetization of silver and the establishment of a gold basis for our currency, as whether the government shall continue to be an unwilling purchaser of silver, and forced to coin it into dishonest currency for which there is no demand, and which the commerce of the country will not employ. Let Congress at the present session make the silver coinage equal in intrinsic value to its equivalent in gold, and the country can afford to wait a few years for the establishment of an exclusively gold standard. The time is not far distant when all the commercial nations will insist upon a circulating medium of uniform value, and when that time comes, gold will inevitably be the basis of such currency. It would probably be impolitic to force this issue at present, but there should be no compromise on the main issue, viz.: that whatever is called a dollar shall be worth 100 cents, full count.

The Saturday Half-Holiday Movement.



LAST YEAR, it will be remembered, by general consent, a large proportion of business houses in New York were closed at 12 o'clock noon, on Saturdays, during the months of June, July and August. The employees in these establishments thus obtained a half day's release from the cares of business in such way as to virtually give them two days' holiday, for they could run into the country on Saturday afternoon, spend Sunday and return to the city Monday morning. Thousands of clerks were thus enabled to obtain a breathing spell in the country who would not otherwise have found time to leave the city. The experiment was found to work admirably; there was no perceptible loss of business, while the employees returned refreshed and rejuvenated from their "outings," and prepared to render better service than they could have done had they been tied down to their work during the height of the hot weather. The brief experiment of last year worked so well that a public movement

has been inaugurated, having for its object the making of the Saturday half-holiday a permanent thing. The promoters of the movement have set to work in the matter in the most effective manner, by appealing to the people to abstain from making their purchases on Saturday afternoons. Mr. Emmet R. Olcott, No. 35 Broadway, has interested himself in the work, and circulars are being sent out from his office to the families of residents, which read as follows :

We, the undersigned, hereby agree with each other and pledge ourselves that from and after the date hereof, we will abstain from making purchases at any stores in the city of New York after the hour of noon on each and every Saturday; and we do hereby request the proprietors of all stores in said city to close the same at the hour of noon of each Saturday, and grant their employees the remainder of each Saturday, after 12 o'clock noon, as a half-holiday. We sincerely believe such concession will inure to the benefit of employers as well as employees.

The undersigned, believing it would be of inestimable benefit to the community at large to have the early closing of stores in this city on Saturdays, which was begun and put in practice during the summer of last year extended to the Saturday of every week throughout the entire year, request that all persons willing to aid such object sign the paper accompanying this request, and that when signed it be returned to Emmet R. Olcott, at No. 35 Broadway, in this city, to whom all communications may be addressed.

Already these documents have been signed by many of the more wealthy and prominent ladies of the city, and, as the press and the clergy are vigorously aiding the movement, it is likely to be successful. Employees themselves can contribute largely to its success by securing signatures to the circulars referred to.

We believe the jewelers can close their doors Saturday afternoons without the loss of a dollar's worth of business. Their customers will readily fall into the way of making their purchases at other times, and the routine business can easily be adapted to the new order of things ; it is, in fact, simply making Sunday a day of thirty-six hours instead of twenty-four. Custom makes the laws of trade and commerce, and these can be altered or amended to suit the convenience of those interested. If custom will decree a half-holiday on Saturdays, business will very soon accommodate itself to the new condition. The promoters of the movement have acted wisely in appealing first to the purchasers of goods to abstain from buying on Saturday afternoons before asking dealers to close their stores. If there are no customers and no business to transact, there will be little temptation to keep the stores open, and employees can as well "go a fishing" as to stand about watching for customers who do not come. Many of the wholesale establishments and some of the more prominent retail houses have been in the habit of closing Saturday afternoons, at least during the hottest months of summer, for several years ; had there been any loss of trade resulting from it the practice would have been discontinued long ago. It is but a short time now to summer, when the early-closing-on-Saturday programme will, doubtless, go into effect for the hot months ; it is to be hoped that public sentiment will be so aroused on the subject that when the half-holidays are commenced again they will be made permanent. It will unquestionably be to the interest of all concerned to take such brief respite from the cares and anxieties of active business competition.

Manufacturers, Jobbers and Retail Dealers.



IN THE February issue of THE CIRCULAR, a correspondent writing over the signature of "New Blood," declares himself to be a "manufacturer, jobber and retail dealer," and argues in defence of manufacturers and jobbers who ignore the legitimate channels of trade and sell their goods to whoever will buy them. The inference to be derived from his signature is that he is a young man and proposes to work his business for all it is worth, regardless of trade traditions, theories and channels, and wholly ignoring the old time lines established to separate the several branches of the jewelry

industry. The position he takes is one that we long ago predicted would be taken by certain classes of jobbers, viz.: the absolute ignoring of the rights of retail dealers, overriding them and seeking the retail trade wherever they could find it. "New Blood" advances no argument in support of his decision that has not been heretofore discussed in our columns. He simply claims that as a manufacturer, he relies for success upon the rapid sale of his products, whereby he is enabled to turn his money frequently, making a small profit on each transaction ; whether his customer is in the jewelry business or not is a matter of utter indifference to him, provided he is prepared to pay for the goods he wants. He cites the case of a buyer for Macy, who ordered his entire stock of a certain line of goods, paid cash on delivery for them, in consideration of which "New Blood" gave him a price which was less than he charged the wholesale dealers in the trade. In this last statement lies the whole grievance of the retail dealers upon this point. They do not object so much to seeing the goods they handle in the stocks of outside dealers, as they do to the fact that outsiders get as good, if not better, terms from the jobbers than legitimate retail dealers are given. In the case cited, Macy bought the goods at less than wholesale price, whereby he was enabled not only to undersell retail dealers, but the jobbers themselves ; in short, he obtained a virtual monopoly of that particular line of goods, and regular dealers who had previously purchased them from Mr. "New Blood" found they were so much "dead wood" on their hands. This was certainly a violation of trade ethics, and of the tacit obligations supposed to exist between manufacturers, jobbers and retail dealers. The code of trade ethics requires that the manufacturer shall have but one price for his goods, and that he shall sell only to jobbers ; that jobbers shall sell only to retail dealers at a moderate and reasonable profit. But of late years the retail dealer finds that he is slaughtered in the house of his friends, who sell their goods to outsiders at jobbers' prices, thus placing them in competition with every Tom, Dick and Harry who chooses to carry a line of jewelry. It is complained that travelers for some jobbers visit a town and load up the retail dealers with goods to their full capacity, and then peddle their stock to other merchants at the same prices. The town is thus overstocked, the market of the retail dealer is destroyed, and all the victims of the indiscriminating traveling man are pitted against each other in the race to get rid of their goods ; prices are cut away down to cost or below, and the retail dealer finds himself out of pocket in such a deal. It is in vain that the retailers protest ; the jobber's excuse is that others sell to outsiders and they must or "get left." As a consequence, the only possible way to prevent sales to outsiders is to persuade all manufacturers and jobbers to recognize only the legitimate trade channels, and to maintain uniformity in prices.

Whether manufacturers and jobbers can ever be brought to agree to this is not only problematical, but extremely improbable. There are some men so constituted that they could not do it even if they had agreed to ; it would grieve them to the very soul if they were compelled to refuse an order for goods, even though it came from the illegitimate and prohibited channels. They are of the "New Blood" stripe who look out for No. 1 every time, regardless wholly of that policy which contemplates catering to "the greatest good of the greatest number." The welfare of the trade in general is nothing to them, but No. 1 is the individual whose interests they have at heart in every transaction. It may be possible to restrain this evil to a considerable extent, but that it will ever be entirely eradicated is not to be expected while selfishness is the predominating characteristic of the human family. It resolves itself into a question of supply and demand—where a demand exists it is sure to find its supply from some quarter. Any outsider who desires a line of jewelry will always be able to obtain it provided he has the money to pay for it, this, too, if every manufacturer and jobber in the land had signed an agreement not to sell to outsiders. No association, no combination can be made strong enough to restrain the cupidity of all men. Never, since the time Judas betrayed his Master, "C. O. D.," has

there been a time when some one could not be found to betray any interest confided to him. This is not putting a low estimate on human nature either, for we have an abiding faith in the integrity of mankind as a rule, but there are exceptions which, while they go to prove the rule that the majority is virtuous, are sufficient to destroy the good work the majority may have in hand.

But there is much to be said in defence of those manufacturers and jobbers who ignore the rights of the retail trade to a greater or lesser extent. The retail dealers are largely to blame, themselves, that outsiders have been brought into competition with them. They have abused their credit, have not improved their opportunities, but have left open the door for outsiders to enter and steal away their trade. The case was strongly presented in a statement recently made to us by a manufacturer of silver ware. He cited a case where a hardware dealer in a certain town applied for a line of his goods. He was refused, on the ground that there was a regular dealer in that place. But the hardware man said the dealer was a watchmaker, and preferred to spend his time at the bench to selling goods, and offered to pay cash for more goods in one order than the retail dealer had purchased on credit in three years. Of course, he got the goods, and as a result he has built up a trade in that town that consumes more goods in one year than the retail dealer sold in five. This was simply a case of a dealer rattling around in a position he could not fill, and made the opportunity for an outsider to take a hand and beat him at his own game. There are hundreds of similar cases in the country, and jobbers and their travelers know every one of them, and act accordingly. There is many a dealer who would rather putter over a fifty cent job of watch repairing than to sell a hundred dollars' worth of goods, and who thinks every hour he spends away from the bench, working up trade, as so much time wasted. He sits in his dingy store, and expects trade to come to him without any effort on his part; he never advertises to let the people know what he has in stock, is always behind in introducing new goods, and is entirely lacking in that spirit of enterprise necessary to make a success of commercial business. Such a man, in addition, is usually impecunious, and has to be carried by his creditors; the trade must recognize him, because he claims to be a retail dealer, but if they can find an outsider more enterprising to handle their goods, they are very apt to do so. Then the sleepy dealer awakes, and complains that the jobbers are cutting his throat. In such a case it becomes a question whether the retailer or the jobber is the throat cutter. The retail dealers also encourage the traffic with outsiders by their unbusiness-like demands for credit. Four months' time on any bill, even the most insignificant, is the rule in the jewelry trade, but when outsiders want goods they usually pay "C. O. D.," or in thirty days at the furthest. Macy, for instance, pays cash for all his purchases the instant the bill and the goods are verified, and it is simply the logic of commercial transactions that he should get bottom prices for everything he buys. There are numerous other "bazaar" merchants who follow his example in this respect, and the fact that they get all the goods they want is evidence that supply will always obey the call of demand, and is also proof of the fact that the regular retail dealers are not supplying the wants of the public. The best means to overcome this outside competition is to infuse more enterprise and better business methods into the retail trade. We know some retail dealers who laugh at these complaints, and say they would like to see an outsider attempt to compete with them in their towns. These are live, energetic men, capable of fighting their own battles. We hear from these dealers every week, in one way or another. Now it is a circular, which they send out to their constituents; again it is a local paper, filled with their advertisements and editorial notices of the new goods they have received. They let the community know they are on hand for business every time; they also take part in all matters of local interest, often obtaining political recognition, and proving that they are wide-awake, public-spirited citizens. Such dealers are not likely to

be ignored by jobbers, or to be confronted with competition by outsiders.

There is much to be said on both sides of this question. It would, unquestionably, be for the best interests of the trade in general, if all its transactions could be confined to what are known as the legitimate channels. But the business methods of to-day are not those of a quarter or a half century ago. All the conditions governing trade and commerce have undergone a wonderful revolution, and new practices to meet them have been introduced. In the race for wealth old traditions are ignored, and the simple question each one is trying to solve is—"How shall I accumulate a fortune in the shortest time?" Every hand is stretched forth to grasp the almighty dollar, and none question the source whence it comes. In olden days it was the strong arm that acquired riches, under the law that "might makes right;" but in these modern days, when property rights are respected, the struggle for wealth becomes one of intelligence, spirit and enterprise, in which the most pushing and the most persistent secure the prize.

The Law of Preferences.



IN COMMENTING upon the various abuses that the credit system is subject to, we have unsparingly condemned that feature of the law that permits a debtor, in case of his assignment, to make preferences in favor of certain ones of his creditors. Instances where an insolvent debtor has thus transferred his property—or, rather, that of his creditors—to his immediate relatives, will be recalled by every member of the trade and need not be specified here. In twenty-two States there are laws prohibiting such transactions, and when a dealer is forced to make an assignment there can be no preferences, all the creditors coming in on an equal footing in the settlement of his estate. An effort is being made to have such a law passed by the legislature of this State. A petition is being circulated for signature among business men asking for such legislation, and it is to be presented at an early day. The petition reads as follows:

To the Honorable the Senate and Assembly of the State of New York:

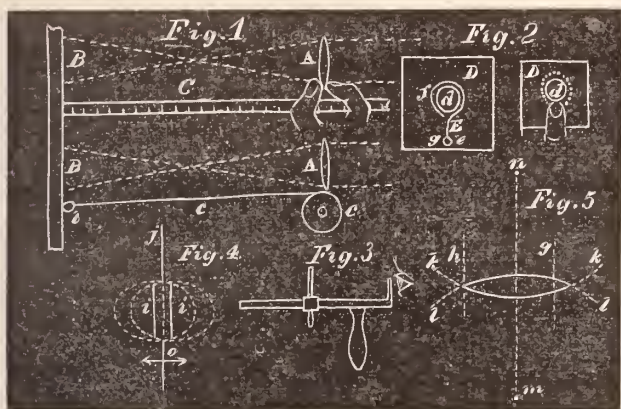
The petition of the subscribers, citizens of ——— in the State of New York, respectfully represents that in our opinion and experience, the operation of the present assignment laws of this State have proved a damage to the credit system, and worked great injury to the mercantile and other business interests of the public at large. First—the law, as it now stands, permits individuals and firms, in anticipation of failure, to assign their property with preferences to any creditor they may select, so that in the end the property so assigned will revert to the insolvent debtor, or any friend or relative for safe keeping, and in almost every instance leaving little or no dividend for the general creditors, thus causing great injury and wrong. Second—It is a well established fact that in some cases credit is obtained from a particular house with the express understanding and promise that, in the event of misfortune and failure in business, an assignment will be executed with preference in their favor. For these and various other considerations, your petitioners earnestly and respectfully request that your honorable body will so amend the assignment laws as to prohibit preferences in any form, including judgment or decree confessed to give preference to any creditor, except for wages due to clerks, servants and laborers. Third—That you will so amend the assignment laws as to provide that each and every creditor under an assignment shall share and share alike pro rata. These are a few of the considerations to which we earnestly and respectfully solicit your careful and prompt attention of this very important subject at your present session, and your petitioners will ever pray, etc.

The above petition has already been signed by many prominent business houses, and we are sure that it only needs to be circulated in the jewelry trade to secure the signature of every legitimate manufacturer and dealer.

Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.

THE READER must not understand that I utterly and entirely countenance the practice of testing lenses by focusing from a window or lamp; I depreciated the idea from its not being sufficiently accurate for matching lenses perfectly. But for getting an approximate focus it is very useful. But in long focus lenses (above 30 inches) it is difficult to get an image sufficiently defined to determine the exact focus. It will probably be well to describe here what are the best conditions under ordinary circumstances for this focusing. The window or light should be at least 20 feet from the screen on which the image is formed, and even this is too close; as, for instance, we are testing a 48 inch lens; now, this is $\frac{1}{2}$ of the distance from the screen to the window, and would materially affect the distance at which the image would be found. But as *all* of your lenses would be tested by the same standard the error would be extended proportionately, but affecting the long focused ones the most. If you have a long or deep store with only the light from a front window, you have the best conditions; go to the extreme back of your store and use as a screen a piece of white card board about 4 inches square. At fig. 1 is shown a very convenient arrangement for such focusing. At *A* is shown the lens, *C* representing the edge of a shelf running toward the window, and *B* the screen. The edge of *C* should be divided into inches. To use this arrangement take your lens between the thumb and finger as shown, and when you obtain a



perfect image on the screen, read off the focus from the edge of the shelf *C*. If no shelf is convenient, a small 2 yard tape measure can be used, holding the tape box in the hand which holds the lens, putting the end with the ring against the screen as shown at *b*, *c* representing the tape measure. A good stock of lenses in the rough should be kept, and every care taken to suit and please your patrons; for a good spectacle trade is no despicable part of a jeweler's profits. A drawer or set of drawers should be provided for keeping lenses, and each drawer divided off into sections as is usually done for watch glasses. These divisions should be arranged in order of their greatest convenience; as, for instance, from 12 to 24 in gradations of 1 inch focal length. Some parties keep gradations of 1 inch from 12 up to 36; but for ordinary stocks, if an assortment is kept as mentioned (from 12 to 24), of gradations of single inches; and from 24 to 48 by gradations of 2 inches, *i. e.*, keep the numbers of even inches, as after 24, 26, 28, 30, etc., up to 48. I do not propose to enter into any argument about the question of lenses of low powers, as, for instance, from 60 to 100, as it is a mooted question among those best able to judge whether there is not more loss than gain to the eye by the use of those low powers. But of this I am thoroughly and completely satisfied, that where you will find one who needs a pair of glasses above 48, you will find 100 which will be better suited with powers from 12 to 36. Below 12, or from 12 down to 4 (which are cataract glasses), lines should also be kept by inch numbers; but the stock need not be so large. By arranging glasses as

directed above you will require 33 divisions, and if you arrange a drawer or drawers to 36 divisions, you will then have 3 extra divisions for a few numbers above or below 4 and above 48 inch foci. Glasses should not be thrown together in the same divisions "*higglety pigglety*," but kept each lens wrapped in tissue paper to avoid being scratched. A few years of carelessness in this respect will destroy, or at least greatly damage, a stock of glasses, and it leads to a carelessness which is next door to dishonesty. To illustrate, suppose we should put in a glass for a party, and it had been shuffled about in our drawers until it is slightly scratched. The visible scratches were not all the damage it had sustained; it had lost the exquisite polish which it had when it came from the hand of the maker. As I instanced, we put it in; the customer or some friend sees the scratches and imperfections and say: "That fellow cheated you and put in an old second-hand glass;" and if you don't lose a customer you get the reputation of being tricky and lose the confidence of your patrons. Safety from an enemy and success in business depends on eternal vigilance. To resume about focusing: the shelf *C* and wall at *B* should be painted some dark color, so the image formed on the white card mentioned will be as bright as possible. In fact, let the surroundings of the position of the white focusing card be as dark as possible. A useful adjunct to focusing of long focus lenses is a piece of dark card board 7 or 8 inches square, with a round hole in the middle of about $\frac{3}{4}$ of an inch in diameter. Such an arrangement is shown at fig. 2, where *D* represents the board and *d* the hole, and the dotted circle the lens to be tested. If a smallish sized board *D* is used, the lens can still be held between the thumb and finger as shown; if a larger one is desired a wire spring, shaped as shown at *E*, can be used; it is attached to the board *D* by the small loop at *e*, while the large loop *f* holds the lens in place. The idea of the device is the board *D* shuts off a good deal of light from around the lens to be tested, and thereby brightens the image on the focusing card. Window or lamp focusing will only give an approximate idea of what is wanted, and serves as a rough guide to the choice and selection of lenses. We will suppose two customers came into our place, one for a new lens to a pair of spectacles or eye-glasses, the other customer wants a new pair. We will consider first the customer who wants a new lens in, say, his spectacles. We try the remaining lens in the frames by focusing, as shown at fig. 1, and find out that the lens is about (say) 28 inches. We next select a 28 inch lens from our stock, and test it as described in last communication, and now find out the lens is 30 inch focus instead of 28. At any rate we match it perfectly by the methods described. Our next customer, the one for new glasses, will generally have an old pair to partially guide us. The old pair, as a rule, will be too young, consequently we should select a pair an inch or two shorter focus. Here is a place where judgment and experience come in with peculiar force; as it will not do to tire our customer's eye out by trying to see with improper glasses, we should have the judgment to reduce the number of pairs of eye-glasses or spectacles to be selected from to not more than three pairs; and in most cases you should depend quite as much on your own judgment as on his choice, because most customers are incompetent to decide exactly what they do need. Many elderly people are so very nervous that the mere trying on of several pairs of glasses will put them in such a state of nervous excitement that they are entirely unfit to judge. The writer has known several instances of people fainting entirely away from trying on a number of pairs of spectacles. A very useful instrument is a test lens mounted as shown in fig. 3; they are so common as to need no comment, and should be kept by all persons who sell spectacles. A few additional facts in regard to lenses should be considered before we leave this part of the subject. Our eyes are arranged to see in pairs, and this binocular vision is of the greatest importance; and the two eyes are arranged and cultivated to see in unison, and in supplying any aid to impaired vision we must be careful to avoid disturbing the ability to see perfectly with both eyes. Every lens has an axis, and it is important to keep this axis

in the line of vision. What I mean by *axis* will be understood by inspection of fig. 5, where the full lines at *G* represents a double convex lens. The two surfaces of the lens are described by the curves *k k* and *l l* swept from the centers *m n*, and a line drawn from *n* to *m* represents the axis of the lens *G*. If the lens had imperfect edges, as shown at the dotted lines *g h*, the axis would not be in the center of the disc. In practical spectacle fitting the axis of the lens should correspond to the axis of the eye, *i. e.*, the axis of each lens should be exactly opposite the pupil of each eye. The axis of any lens can be established by looking through it at a fine line, as shown in fig. 4, where the dotted ovals represent a spectacle lens and the perpendicular line a fine black or white thread. We will suppose we are testing a lens for its axial center—say, a lens of 18 inch focus, we would stand or sit about 3 or 4 feet from a No. 40 white cotton thread suspended as a plumb line, and hold the lens 12 or 14 inches from the line. We move the lens back and forth in the direction of the double headed arrow *o* until the lens shows the magnified image on a direct line through the lens. Now, mark with a piece of hard soap the position of the axis with a short perpendicular line. Next turn the lens $\frac{1}{4}$ way around so as to get another short line at right angles to the one just established, and where these lines cross is the axis of our lens. And in all glasses we fit up with care, we should arrange them so the axis comes opposite each eye. Care in this respect will save glasses from tiring the eyes, a very common complaint from persons just commencing to use spectacles.

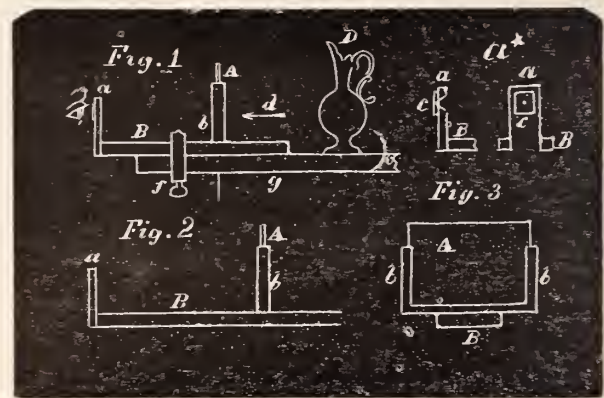
Free-Hand and Mechanical Drawing.

BY EXPERT.



WE WILL now briefly consider the subject of drawing directly from nature, no matter whether some natural object or a machine. The writer considers it a better course to pursue for the student to perfect his hand and eye in technical execution, as was explained in last article, and then take real objects for his practice, than to copy specimens of somebody else; for, in most instances, these specimens were hastily executed by persons of inferior skill for the sake of making a book. I know there are exceptions, but these exceptions are very expensive, and, in many instances, are mis-conducted efforts in the art (a peculiar one) of instruction. No person who has paid any attention to drawing but has experienced difficulty in establishing on his paper the proper form and proportions, outlines, it is usually termed, for the object he was attempting to delineate; especially some machine. If it was a natural object like a scene in nature, a landscape, for instance, if he made a mountain a trifle too high for the right proportions, or a tree too low, a river too wide, it all passed unnoticed. But change for some mechanical structure to be shown in perspective, and any errors in the relative proportions would be at once detected. This condition of things led the writer, quite a number of years ago, to devise a simple perspective machine to aid in drawing the outline correctly at once. The principle of the machine is, briefly, making use practically of the idea used in illustration of pictorial extent and position in former article, *i. e.*, using a plate of glass through which we see the object to be drawn. The plate of glass is mounted in a suitable frame, and coated with some transparent substance on which you can mark with a lead pencil. The simplest form of such a perspective machine is shown at fig. 1 in a side view, and consists of a piece of inch board 4 inches wide and 20 inches long, shown at *B* in all the accompanying illustrations. At one end of this board *B* is an eye piece *a*. This eye piece is also of wood, but only about $\frac{1}{4}$ of an inch thick, and it should rise above *B* about 4 inches, to which it should be securely attached. Near the top of this eye piece *a* is a hole for looking through. This hole can be made directly in the wood, but it is better to make the hole in the wood too large, and

place over it a piece of metal with a small aperture. To be more definite in sizes—say wood eye piece *a* is 4 inches high, $1\frac{1}{2}$ wide; hole in wood $\frac{1}{2}$ inch; metal plate *c* to cover $\frac{1}{2}$ inch hole is made of No. 24 brass and 1 inch square; hole in brass plate $\frac{1}{2}$ of an inch. The brass plate *c* should be painted black to prevent glare of light. At diagram *a** the eye piece *a* is shown separate. At *A*, fig. 3, is shown the glass plate; a convenient size for practice is 10x12 inches. A nice smooth piece of ordinary window glass will answer. This glass plate *A* is mounted in a half frame *b*, as shown in fig. 3, which is a view of *A*, fig. 1, seen in the direction of the arrow *d*. The pieces *b* are grooved to let the glass *A* slide in and hold it steady. The groove need only be in the two perpendicular pieces *b b*. By having the half frame *b b* slide on *B* the glass *A* can be placed or adjusted to almost any scale. A clamp shown at *f* will attach this little machine to the table *g*. The instrument just described will serve our purpose for the present, and we will subsequently describe a similar machine of greater range of power. The glass *A* is prepared to receive pencil tracing, by simply coating it with the white of an egg mixed with an equal quantity of water, and thoroughly beat up with a fork or spoon. After which it is allowed to stand until it becomes fluid, when it is either brushed on the glass or flowed on as photographers flow on collodion. The way to do this is to pour on the glass, say, a spoonful of the mixture (white of egg and water), and by tipping the plate in various directions it is made to flow over the entire surface. The glass plate is now set up on one edge to drain and dry. When perfectly dry the pane of glass is as transparent as before the coating was applied. Indeed, it is necessary to mark the side coated so as to know which side will take the pencil. If, now, the instrument is clamped to the table (*g*) as shown, and some object, as *D*, placed at such a distance from the glass *A* as will give you the right size when traced on the glass. You now take a lead pencil and delineate the form on *A* with the greatest



precision. Not only can the outline be established, but the masses of light and shade defined. I do not claim that such an instrument is indispensable to the experienced artist, but I do hold that for the beginner and amateur it is a great help. Let any person who has ambitious views in the way of drawing make this cheap, simple instrument, and try his hand on a group of Rogers' statuary or a bronze statuette, and then compare the result with anything he could produce without this aid, and he will soon satisfy himself of its value. After the eye and hand are sufficiently educated then dispense with it. After the tracing is made with a lead pencil on the glass, remove the glass from the frame *b* and lay it on a sheet of white paper where the pencil lines will become distinct; to render them more so you can go over the pencil lines with ink; India ink or Caws' writing fluid answers perfectly. Tracing paper can now be used and a copy of the design on the glass made, when by means of transfer paper the tracing can be transferred directly to the paper or canvas on which the final drawing or picture is to be made. It may not be amiss to recapitulate and give the full details. After the pencil drawing on the glass has been gone over with ink, a copy is made (also best in ink) on tracing paper. Tracing paper is heavy English tissue paper prepared by brushing over one side with Damar

varnish thinned with turpentine, or Canada balsam thinned with turpentine. After the paper is thoroughly dry it can be marked on with either a lead pencil or a pen and ink. Transfer paper is made by brushing over one side of the same kind of English tissue paper with a mixture of equal parts by weight of tallow and olive oil, lamp black, $\frac{1}{4}$ parts; spirits of turpentine, 5 parts. After the turpentine is evaporated the transfer paper is ready for use. To transfer the tracing on the transparent tracing paper, to the paper on which the drawing is finally to be made, lay a sheet of the transfer paper with the black side down on the drawing paper; place the tracing on the transparent paper over it, adjusting the tracing so it is correctly over the drawing paper or canvas, when the three thicknesses of paper are fastened together with drawing tacks. Next, with a piece of pointed hard wood or ivory (the point should be as fine and smooth as possible, and not cut or puncture the paper) go over the tracing in detail. On removing the tracing and transfer paper, a complete copy of the original pencil drawing on the prepared glass will be found on the drawing paper, ready to be put into light and shade with pen and ink, charcoal, or even colors. The best way is to commence with simple subjects; say, make a drawing of your ink stand, shading with pen and ink lines. Or take some piece of machinery, a lathe, for instance.

The History of Goldsmithing.

Continued from page 7.

CHAPTER VIII.

CONTEMPORANEOUS PERIOD.

The closing years of the 18th century had been a sterile epoch for goldsmithing. The industries *de luxe* cannot prosper amidst the convulsions and miseries of war. Nations were either waging a fratricidal, intestine feud, or engaged in deadly combat with others. France, England, Germany, America, Austria—bloodshed everywhere.

When, finally, the bloody warfares ceased, about the beginning of the present century, and with it a revival of styles became necessary, it was found that everything had changed—institutions, ideas, morals, tastes, inclinations.

Naturally nothing lay closer at hand than the much hackneyed and abused Greek and Roman styles—everything had to conform to them. France at that time was the chief seat of this plagiarism—of antique styles applied to modern arts, and the chief priest of this school was the celebrated painter David, formerly a fugitive revolutionary spirit, who afterward became the first painter of the empire. He sought with all the force of his talent to combat the false taste of the reign of Louis XV., but himself drifted in the very opposite direction, and sought to apply to everything the gauge and to bring it under the despotism of conventional rules. He forgot that by clipping the wings of genius he, at the same time, deprived it of vitality.

David represented the official art under Napoleon I., as Lebrun had represented it under Louis XIV.—with this difference, that while Lebrun, who was a very talented decorator, had become inspired with all the tastes and inclinations of his time, David, who was an eminent painter, and whose skill stands beyond question, understood absolutely nothing of decoration, and in his unhappy plagiarism of the antique he entirely left out of consideration the wants and conditions of the present epoch.

In furniture he understood only square and angular forms on which a person was constantly liable to hurt himself; curulean chairs with wooden backs, folding chairs with griffin's feet, stands in the shape of tripods, clocks in the form of altars, urns—in fact, everything was of an impossible shape and very much out of place everywhere. Ball room furniture looked as if it should have stood in the dining-room and *vice versa*; but, of course, everything con-

formed to the conglomerated Roman and Greek styles made to do duty in the 19th century.

It is barely necessary to mention that goldsmithing had to comply with this style. Two goldsmiths, Caille and Biennais, the goldsmith of Napoleon, attained to distinction. The latter wrought quite a number of pieces for the church, and for the sovereign also several swords of ceremony, after the designs of the architect, Percier; next an altar with bas-reliefs, crucifix and chandelier for the marriage celebration of Napoleon with Marie Louise, of Austria, and several sacred vases for the church of St. Denis.

On the occasion of the same marriage, the city of Paris, true to the old traditions and usages of the ancient monarchy, presented to the new empress a complete toilet set with dressing mirror and fauteuil, all of brass.

The occasion of the birth of the King of Rome soon afterward, offered another opportunity for display, and the city presented the august pair with a cradle for the young prince, constructed according to the design drawn by Prudhon, the court painter of the empress. The two long sides, as well as head and foot of the body, were formed of mother of pearl balustrades, lined with bright orange-yellow velvet; each of the former contained a central tablet, one representing the Seine, the other the Tiber, in allusion to the native place, the city of Paris, and to Rome, the name of which the young king bore. A shield, bearing the emperor's monogram, rose over the head of the cradle, and was crowned with a star-studded sphere, upon which slightly knelt a winged figure representing the Goddess of Glory. Between her outstretched arms and hands she held a laurel crown surmounted by a wreath of stars, from which hung the costly lace curtain. Perching upon the balustrade, at the foot of the cradle, stood a young eagle ready to take flight, fixing its gaze upon the large imperial star in the wreath of stars above. Cornucopias of abundance, crossing each other, formed the four feet of the cradle; against them leaned the figures of two winged children, one representing Force, the other Justice.

All the figures, the bas-reliefs and the shields, were of silver-gilt. They had been modeled by the sculptor, Radiguet, and were wrought by the goldsmiths, Thomire and Odiot, both of whom were becoming famous.

In 1815 Odiot was colonel of one of the legions of the national guard, and, as such, being under the order of Marshal Moncey, contributed very honorably to the defense of the city of Paris.

His fame grew under the Restoration, but fashions and styles had changed. And how could it be otherwise; was not the restoration of the old forms of royal government the very counterpart of those of the Revolution and the Empire? Beside this, princes and the numerous nobles who had fled from France, re-entered it after a long absence, and they had become accustomed to other styles, German, Italian, English, etc.

Beside Odiot, we may mention another ingenious goldsmith, Fauconnier, who was trained by the former. He was the son of a poor goldsmith of Longwy, in Lorraine, and, while still very young, had come to Paris to perfect himself in his art. He had the good fortune to be employed by Odiot, who very soon afterward made him his superintendent; when marrying, he established himself in business. This was at the time when the marriage of the Duchess de Berry for a time infused new life into the old court of France. The Duchess loved the arts, or, at least, she loved to play the role of protectress. Wishing to make a present to the celebrated painter Girodet, she commissioned Fauconnier to make for her a vase of silver, in the design of which should be gathered the different branches of art of the painter. Giving great satisfaction in this work, he soon after received an order for a vase, one meter high, to be presented to the Sultan by King Charles X.

For this purpose he associated himself with a very skillful chaser, Tamisier, and, as the figures of several lions formed a part of the decoration of the vase, he frequently also called in the assistance of the sculptor, Barrye. Being a true artist, Fauconnier, as will be

seen, left nothing undone to make his piece of work as perfect as he was able to. Unhappily, however, he had more talent than money or business capacity—so much so, that he managed to lose ten thousand francs in the making of the vase. The court offered him the opportunity of partly making up his loss by ordering a table service from him, but in spite of this he was unable to keep out of bankruptcy. His affairs drifted from bad to worse, and finally the poverty stricken court jeweler was dispossessed, and all his property and working tools seized. When this became known, the Duke of Montmorency secretly bought up the tools sold at an auction, and returned them to the master.

This continual strife against bad fortune did not in the least abate his ardor for the art. In the first part of this century he wrought a silver-gilt vase, of the height of four feet, presented by subscription to General Lafayette. It is of very simple ornamentation, the shape of the vase being constructed according to classical models; it stands upon a base ornamented with bas-reliefs, and is flanked by four allegorical figures. The votive inscription is engraven upon the representation of drapery held by two angels with half folded wings; the neck of the vase is entwined by a civic crown—a wreath of oak and laurel leaves; the lower part is decorated with leaves and flowers peculiar to North America. Two principal bas-reliefs, representing the capitulation of Lord Cornwallis and the Federation of 1790, ornament the principal faces of the base, and the allegorical figures of Liberty, Law, Force and Justice stand at the corners.

We have now brought this history of goldsmithing down to our own times, and the masterpieces, as well as the masters who wrought them, are well known to our readers, it is therefore useless to repeat them here at length; having disposed, as far as lay in our power, of the vast quantity of matter before us, a large portion of which could not more than receive a passing glance, while much more could not be mentioned at all for want of space, we close our chronicle.

[THE END.]

[Reprinted from the Mineral Statistics of the United States for 1883-1884. Edited by Mr. Albert Williams, Jr. Published by the Geological Survey.]

Precious Stones.

BY GEORGE F. KUNZ.

Continued from page 10.



IN THE cabinet of Dr. Isaac Lea, of Philadelphia, there are perhaps thousands of remarkably fine and unique inclusions in quartz, as well as in all known gems, probably, in fact, every known form of mineral inclusion, forming undoubtedly the finest cabinet of "included minerals" in the world, the result of scores of years of keen observation and careful microscopic work. In the cabinet there are, of course, many stones which could be cut into fine gem stones, but which possess a higher interest as mineralogical specimens.

Agate and chalcedony.—The "trap" at Farmington, East Haven, Woodbury and Guilford, Connecticut, affords agates of considerable beauty, though rarely over 3 inches across. The so-called chalcedonic balls of Torrington are very handsome when polished, and the rich carnelian shades of milky translucency afford a pleasing contrast. Many of these were cut into the form of sealstones as early as 1837*, which were fully equal to any from abroad in the delicate arrangement of the layers and the richness of the colors. At Natural Bridge, Jefferson county, New York, fine agates have been found. The Belmont lead mine, Saint Lawrence county, has afforded some very good chalcedony. White, yellow and blue chalcedony of good size was found 4 miles east of Warwick, at Bellevue, Orange county, New York, by Dr. W. Horton†.

* C. U. Shepard: "Mineralogical Report of Connecticut," 1837.

† "Geological Survey of New York," 1840; Report on Orange county minerals.

Chalcedony is found in Delaware county, Pennsylvania, principally at Middletown and Marple. Brown botryoidal masses occur at the Hopewell mine; also at Williston, West Nottingham, West Goshen and London Grove townships, in Chester county; a pale blue variety at Cornwall, Lebanon county; near Rock spring and Wood's mine, in Lancaster county; between Clay and Hamburg; also at Flint hill, Berks county; in Cherry valley, Munroe county; at Conshohocken, Montgomery county, and at other localities in Pennsylvania. In many of these localities, especially in Delaware and Chester counties, ringstones, sealstones and other ornaments are worn by the residents who have had them cut from local material.

Agates are found abundantly on the entire Lake Superior shore and along the Mississippi river, especially in Minnesota, and fine chalcedony occurs 5 miles north of Grand Rapids, Wisconsin. Agate and chalcedony are both found at the Fox river, Illinois. Agate, chalcedony and carnelian are found near Van Horn's well, Texas, and near Hot Springs, Arkansas.

The agates of the Yellowstone National Park and Holbrook, Arizona, equal any yet found.

A rich fawn and salmon-colored chalcedony has been found in Burke county, North Carolina, by E. A. Hutchins. At Caldwell's, Mecklenburg county; near Harrisburg and Concord, Cabarrus county, and Granville, Orange county, and in other localities in North Carolina, fine agates and chalcedony have been found.

In Colorado chalcedony is found 8 miles south of Cheyenne mountain at the Los Pinos agency at Chalk Hills; on the bluffs near Wagon Wheel Gap and along the upper Rio Grande valley; in Middle and South parks, Buffalo park, Fair Play, Frying Pan, Trout creek, Gunnison river, and frequently in drift accumulations.

Agate is found in fine specimens lined with amethyst on the summit of the range of the Animas, clouded white and gray in the lower trachytic formations of the Uncompahgre group. It occurs in a variety of forms, clouded, banded, laminated and in a variegated form, at the Los Pinos agency; also in the South park in the drift, in the lower Arkansas valley, on the Frying Pan, and throughout the Middle park in the form of onyx and sardonyx, on the lower Gunnison and adjacent regions.

Prof. W. P. Blake‡ mentions large masses of white chalcedony, delicately veined and in mammillary sheets, near the Panoches, in Monterey county, California; on Walker river, Nevada; also of a fine pink color near Aurora, Esmeralda county, Nevada; and in pear-shaped nodules in the eruptive rocks between Williamson's Park and Johnson's river, Los Angeles county, California.

Beautiful pebbles of agate and chalcedony are abundant along the beach at Crescent City, California, and are often cut as souvenirs; they are usually of a light color. In the pebbly drift of the Colorado river they are more highly colored, more abundant and of larger size; many of the surf-worn pebbles of the Pescadero beach, California, are agate and quartz, of very fine bright colors; occasionally these are utilized as gem stones. Fine agates and jaspers are found about the Willamette, Columbia and other rivers in Oregon. Beautiful red and yellow carnelian and sardonyx result from the silicification of the corals and sponges at Tampa bay, Florida, and although the pieces are not large, the colors being natural are very good.

The silicified bones of the *atlasaurus* found at Morrison, Colorado, have at times a coarse cellular structure, infiltrated with carnelian, giving a very pleasant effect of a brilliant red striped and mottled appearance.

Chalcedony coats and incloses the crystallized cinnabar of the Redington and other mines of California; and these crusts, if cut with the cinnabar, form very pretty and interesting gem stones.

Silicified coral.—The true silicified corals found at Schoharie, New York, along the Catskills and at a large number of other American localities, form very pretty gem stones. Some similar to the so-called fossil palm wood from India have been observed at a few localities in New York State. One very interesting black siliceous coral form

‡ "Minerals of California," page 9, 1866.

with large white markings was found at Catskill, New York; when cut across the large white columnar lines the effect was very pleasing and ornamental.

Silicified wood.—In the valley of the east fork of the Yellowstone river, and in the volcanic Tertiary rock, which here attains a thickness of 5,000 feet, and is made up of fragmentary volcanic products which have been apparently redistributed by water and now form breccias, conglomerates and sandstones, Mr. W. H. Holmes§ mentions the occurrence of silicified wood in great abundance, and in some cases the trunks are *in situ* in these strata.

In the valley of the main Yellowstone, in the Gallatin range and about the sources of Cañon and Boulder creeks, also near the divide at the head of Boulder creek, and at a number of points above this line, may be observed trunks many feet in height and of gigantic proportions standing in the identical strata in which they grew. In general, these strata are horizontal. Three miles south of Gardiner's river, at an elevation of 6,000 feet above the sea, silicified trunks are found in sandstone belonging to the same strata. On the south side of Third cañon, opposite the mouth of Hell-roaring creek, is a massive promontory in which many fine trunks are exposed in a conglomerate. At Amethyst or Specimen mountain some of these trunks have been found 10 feet in diameter. Many thousands of silicified trees are found; in some cases the structure is well preserved, and in other cases completely agatized or opalized, and lined with crystals of calcite, quartz and beautiful amethysts. In this locality many of the finest specimens of American silicified wood are found.

The workmen on the Denver and New Orleans railroad in 1882,|| when within 20 to 30 miles of Denver, Colorado, between Cherry and Running creeks, were met by an obstacle in the form of a buried forest. The trees are of various sizes, all silicified and agatized, and buried at depths of from 10 to 20 feet; they are very perfect and are met with in a half dozen localities.

Numerous newspaper articles have appeared on the utilization of the petrified forests near Holbrook, Arizona, by a company which is making large ornaments of the material, and gradually driving the so-called California and Mexican onyx out of the market. A company has been formed, indeed, and a large exhibition of this material was made at New Orleans, and a quantity of the mineral was sold, usually as small paper weights or for small jewelry ornaments. The company has been re-organized, and with its new sawing machinery hopes to be able to cut table-tops, tiles and for other like purposes. The material is one of the finest known for color and hardness that could be used in this way. A stump, 18 inches across and 3 feet high, was sold to a Russian at New Orleans. Immense quantities of the material exist in Arizona and in magnificent specimens. One in the Peabody museum is fully 24 inches across and very compact; some of the trunks are at times magnificently lined with quartz and amethyst. One tree, fully 100 feet long, spanning a chasm and making a natural bridge is one of the attractions. Some use may arise for the material if cheap polishing and slitting can be introduced, and no doubt in the near future some developments will be made in this line, since a second company has obtained property adjoining that of the company doing the work. The cutting of some sections of a 12 inch trunk into bottoms for solid silver trays is one of the novelties introduced by a leading jewelry firm.

Moss agate.—Moss agate was formerly found near Hillsborough, Orange county, North Carolina. The agatized trees from Holbrook and Specimen Mount show these mosslike markings more like the fine treestones from Brazil than our common American agate. One curious stalactite of chalcedony, about 3 inches long and having the appearance of a piece of common sperm candle, had a black core through its entire length about the size of a candle wick, making it at first sight scarcely distinguishable from a half-used candle. It

was unfortunately cut into a number of matched stones for cuff buttons, which were very unique with the beautiful black central dot.

In the southeastern part of Humboldt county, Nevada, are large quantities of moss agate of the dendritic and "fortification" forms, which, however, have been utilized to a very limited extent.

Moss agate has been very sparingly used during the past year, the sales amounting to not over \$1,000. Since the recent introduction into cheap jewelry of the Chinese natural green and artificially colored red and yellow moss agate, the sale of the American has almost entirely fallen off. A so-called moss agate is found at Rock Springs, Lancaster county, Pennsylvania, and also near Reading, Berks county. A beautiful moss jasper is found in Trego county, Kansas.

Chrysoprase.—Possibly the best American chrysoprase was found within the last year by Mr. F. E. Monteverde, at Nickel mountain, near the town of Riddle, Douglas county, Oregon. The chrysoprase was observed in small veins about one-eighth inch thick, and furnished a number of flat stones of a rich green color, that were over 1 inch square; it occurs in a vein of serpentine associated with the nickel ores.

Traill¶ mentions chrysoprase from New Fane, Vermont, which mineral Prof. J. D. Dana refers to green quartz and not chrysoprase, although it was also so called at the locality where found.

A fine green colored specimen intermixed with a black hornblende that would afford gems 1 inch across was shown to me by Mr. E. A. Hutchins, of New York, and was found at some locality in Macon county, North Carolina.

Mr. Thomas A. Tabor, in 1839, mentions in a letter to Dr. C. A. Lee the occurrence of chrysoprase in Chester county, Pennsylvania, without any description of its quality, though one would infer that it was of gem quality, since Mr. Tabor was a jeweler. Dr. F. M. Endlich* mentions chrysoprase as of rare occurrence in Middle Park, Colorado.

Opal.—Beautiful fire opal without any opalescence is found in Washington county, Georgia, and was first described by Prof. G. J. Brush, who has the finest piece in his cabinet. It is a vein about one-fourth inch thick and 2 inches square.

Common opal occurs rarely in small masses of a greenish and yellowish white with vitreous luster, at Cornwall, Lebanon county, Pennsylvania. It is found at Aguas Calientes, Gilson gulch, at Idaho Springs, Colorado, in narrow seams in the granite, and most of it is brownish. Mr. J. W. Beath states that he has seen fine opal specimens showing play of colors, said to have come from the Idaho Springs locality. At Colorado Springs it occurs milk white in color.

The following is communicated by Mr. C. G. Yale: "While the precious opal has never been found in the Pacific division, the common kind occurs in numerous localities. Large and very beautiful opalized wood is frequently found in the hydraulic mines of California. Small stones in great number are also taken out of some of the drift mines. A few of these being infiltrated with the oxide of manganese, giving them the appearance of being filled with moss or possessing other peculiarities, are enough sought after to give them some little value."

Hoffmann† mentions opal in magnificent colors (evidently opalized wood) with silicified wood, and states that on breaking some of the large trunks at San Antonia, Nevada, fine specimens were obtained.

Hyalite occurs with cachalong at several localities in Yavapai county, Arizona; at the Philips ore bed, Putnam county, New York; and cachalong at Bellevalle, 4 miles east of Warwick; in Burke and Scriven counties, North Carolina; in yellow fluorescent coatings upon gneiss at Frankford, Pennsylvania, and at Avondale, Delaware county, in bluish-green; also at Megarge's paper mill on the Wis-

¶ "Quartz and Opal," page 35.

* "Catalogue of Minerals found in Colorado," 1876; tenth annual report of the Hayden Survey, page 150.

† "Mineralogy of Nevada."

§ "Geology of the Yellowstone National Park," page 48.

|| A. E. Foote, *Naturalist's Leisure Hour*, July, 1882, page 32.

sahickon. Hyalite occurs at Concord, Cabarrus county, and the Culsagee mine, Macon county, North Carolina. Associated with semi-opal it is mentioned in the Mount Diablo range about 30 miles south of Mount Diablo.

Prof. W. B. Blake† mentions that a rich white variety of opal is found at Mokelumne Hill, Calaveras county, California, or on the hill near that place known as Stockton hill, on the west side of Chile gulch. A shaft had been sunk 345 feet, and the opals were found in a thin stratum of red gravel. They varied in size from that of a kernel of corn to a walnut, many of them containing dendritic infiltrations of oxide of manganese resembling moss. In 1866 about a bushel of these stones were raised in a day, and were reported to have a market value. A milky variety similar to the above, and without fire, is found with the magnesite on Mount Diablo, 30 miles south of the mountain; also in the foot hills of the Sierra at the Four creeks.

Beautiful pieces of a moss-marked opal, similar to moss agate, are found in Trego county, Kansas. They are often 3 and 4 inches across.

Semi-opal is found together with the chalcedonies at the Los Pinos agency, and north of Saguache creek, Colorado, in trachyte.

Geyselite.—Some of the geyselite from the geysers in Yellowstone park, especially at Firehole river, occurring in such a variety of concretionary and imitative forms, might be used for small ornaments.

Jasper.—Dr. Genth mentions that cat's-eye has been observed in several localities; a fair hexagonal crystal with the pyramid of greenish color, resulting from very fine fibers of actinolite disseminated through it, came from York county, Pennsylvania; it is found also 5 miles east of Bethlehem at the allanite locality, but not of gem quality.

A curious dark-gray piece of quartz was observed from the West Shore railroad tunnel at Weehawken, New Jersey§, that was filled with what seemed to be byssolite, but may be an altered pectolite, and would cut a tolerably fair mineralogical cat's-eye.

(To be Continued.)

The Theory of Polishing Metals and Polishing Agents.



METALS ARE polished either by burnishing or buffing.

The process of burnishing consists in rubbing down all the minute roughness by means of a highly polished steel or agate tool—none of the metal being removed. The action of the burnisher appears to depend upon two circumstances: first, that the harder the material to be polished the greater luster it will receive; the burnisher is, therefore, commonly made of hardened steel, which exceeds in hardness nearly every metallic body. And, secondly, its action depends on the intimacy of the contact between the contact and the work; and the pressure of the brightened burnisher being, in reality, from its rounded or elliptical section, exerted upon only one mathematical line or point of the work at the time, it acts with great pressure and in a manner distinctly analogous to the steel die used in making coin; in which latter case the dull but smooth blank becomes instantly the bright and lustrous coin, in virtue of the intimate contact produced in the coining press between the entire surface of the blank and that of the highly polished die.

It by no means follows, however, that the burnisher will produce highly finished surfaces, unless they have been previously rendered smooth and proper for the application of this instrument, as a rough surface, having any file marks or scratches, will exhibit the original defects, notwithstanding that they may be glossed over with the bur-

nisher, which follows every irregularity; and excessive pressure, which might be expected to correct the evil as in coining, only fills the work with furrows or produces an irregular indented surface, which, by workmen, is said to be *full of utters*.

Therefore, the greater the degree of excellence that is required in burnished works, the more carefully should they be smoothed before the application of the burnisher, and this tool should also be cleaned on a buff stick with crocus immediately before use; and it should in general be applied with the least degree of friction that will suffice. Cutters mostly consider that burnishers for steel are best rubbed on a buffstick with the finest flour emery; for silver, however, they polish the burnisher with crocus, as usual. Most of the metals, previously to their being burnished, are rubbed with oil to lessen the risk of tearing or scratching them, but for gold and silver the burnisher is commonly used dry, unless soap and water or skimmed milk are employed; and for brass furniture beer or water, with or without a little vinegar, is preferred for lubricating the burnisher.

Buffing is performed by rubbing the metal with soft leather, which has been charged with very fine polishing powder. The rubbing is sometimes done by hand, but more frequently the buff is made into a wheel which revolves rapidly in a lathe, and the work is held against it.

The polishing powder that is selected must be chosen with special reference to the metal that is to be buffed. Thus, for steel and brass the best polishing powder is crocus or rouge, which may be purchased from any material dealer, or may be made by exposing very clean and pure crystals of sulphate of iron to heat, according to the directions given hereafter under the head of *Polishing Agents*. The hardest part of the rouge must be selected, and great care must be taken to have it clean and free from particles of dust and sand, which would inevitably scratch the article to be polished, and render it necessary to again repeat all the previous processes of filing, grinding, etc.

Soft metals, like gold and silver, may be polished with comparatively soft powders, such as prepared chalk or putty powder (oxide of tin).

When metals are to be polished in the lathe the process is very simple. After being turned or filed smooth, the article is still further polished by means of fine emery and oil, applied with a stick, and in the case of rods or cylinders, a sort of clamp is used so that great pressure can be brought to bear on the part to be polished. The work must be examined from time to time to see that all parts are brought up equally to the greatest smoothness and freedom from scratches, and as fast as this occurs, polishing powder of finer and finer quality is used, until the required finish is attained.

In polishing metals or any other hard substances by abrasion, the great point is to bring the whole surface up equally. A single scratch will destroy the appearance of the finest work, and it cannot be removed except by going back to the stage to which it corresponds, and beginning again from that point. Thus, if in working with a smooth file we make a scratch as deep as the cut with a bastard file, it is of no use to try and remove this scratch with the smooth file, we must go back, and, taking a bastard file, make the surface as even as possible with it, and afterward work forward through fine files and polishing powders.

POLISHING AGENTS.

Nothing is more necessary to the successful use of polishing powders than equality in the grain. Fine dust clogs the action of coarse grinding powders, and prevents them from cutting with rapidity the object to be ground; coarse particles mixed with fine polishing powder scratch the article to be polished, and render grinding and polishing necessary again. To secure fineness and uniformity, no process equals that of elutriation, which is thus performed: Suppose it were desired to separate the ordinary flour of emery into three different degrees of fineness. Take three vessels (such as tin pails or glass jars), and mix the emery with a large quantity of water—say one quart of water to 1½ ounces of emery. Stir the mixture

† "Catalogue of California Minerals," 1866, page 18.

§ Cabinet of G. F. Kunz.

until the emery is thoroughly diffused through the liquid, and allow to stand five minutes. By this time all the heavier particles will have settled, and on pouring the fluid into a second jar only the finer portion will be carried over. So continue to wash the first residuum until nearly all the particles have subsided at the end of five minutes, and the water is left comparatively clear. You will now have the coarse portion, No. 1, by itself.

So, from the sediment collected from the washings of No. 1, you may collect a portion, No. 2, having a second degree of coarseness. The last and first will be obtained by letting the final washings stand ten or fifteen minutes, pouring off the liquid and allowing it to settle.

The principal polishing powders are chalk or whiting, crocus or rouge, emery, oilstone, powder and putty, which latter consists chiefly of oxide of tin. Other powders, such as tripoli, bath-brick, sand, etc., are rarely used for the finer kinds of work. Emery is so well known that it does not require description.

Chalk or Whiting.—Chalk is a native carbonate of lime, consisting of the remains of minute creatures known as *foraminifera*, and when simply scraped or crushed under a hammer or runner, it is sometimes used for polishing such soft substances as bone, ivory, etc. As it contains particles of silica of varying size, it cuts freely but is apt to scratch. To remove the gritty particles, the chalk is ground and the finer parts separated by washing. It then becomes *whiting*, which is generally sold in lumps. Whiting has very poor cutting qualities, and it is therefore used chiefly as *plate powder* for cleaning gold, silver, glass, etc., and for absorbing grease from metals which have been polished by other means.

Prepared Chalk.—This is a manufactured article prepared by adding a solution of carbonate of soda to a solution of chloride of calcium (both cheap salts), so long as a precipitate is thrown down. The solutions should be carefully filtered through paper before being mixed, and dust should be rigorously excluded. The white powder which falls down is carbonate of lime or chalk, and when carefully washed and dried it forms a most excellent polishing powder for the softer metals. The particles are almost impalpable but seem to be crystalline, for they polish quickly and smoothly, though they seem to wear away the material so little that its form or sharpness is not injured to any perceptible degree.

Crocus or Rouge.—These articles are manufactured at Liverpool, by persons who make it their sole occupation, in the following manner:

They take crystals of sulphate of iron (green vitriol or copperas) immediately from the crystallizing vessels, in the copperas works there, so as to have them as clean as possible, and instantly put them into crucibles or cast iron pots and expose them to heat, without suffering the smallest particle of dust to get in, which would have a tendency to scratch the articles to be polished. Those portions which are least calcined and are of scarlet color, are fit to make rouge for polishing gold or silver, while those which are calcined or have become red-purple or bluish-purple, form crocus fit for polishing brass or steel. Of these, the bluish-purple colored parts are the hardest, and are found nearest to the bottom of the vessels, and consequently have been exposed to the greatest degree of heat.

(To be Continued.)

Flashions in Jewelry.

A Lady's Rambles Among the Jewelers.

A FEATURE of this month's ramble among the jewelers, as, indeed, for some months past, has been the alacrity with which different manufacturers and dealers disagree as to what is in fashion and what

is not. This is simply a case of "who shall decide when doctors disagree." The two great fashion centers of the world, London and Paris, are at loggerheads as to styles; indeed, the breach is very wide between them. Quiet colors in London, gay hues in Paris; close hats in London, broad brimmed ones in Paris, and so on *ad infinitum*. American ladies the meantime are quietly taking advantage of the situation by selecting what pleases them best from both sources, as well as adopting styles originated at home. While this state of dress-as-you-please exists, manufacturers must not be astonished when Boston dealers will buy only oxidized silver jewelry, for instance, Philadelphia wants only the bright and New York inclines to a combination. On one point, however, everybody is agreed, and that is the welcome accorded by patrons to new things possessing beauty and utility at a reasonable cost.

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THERE is no disguising the fact that novelties in jewelry are demanded now in this country by a large patronage. The rage for something new, it is true, does not possess our people to the same extent that it does the gay Parisians, nor do our manufacturers hazard the introduction of so many senseless fantasies, that in the nature of things cannot outlive the season that produced them, as do the Paris makers. Yet, the fact remains, novelties are in request, and wide-awake manufacturers are all the while on the alert to surprise the lovers of innovation with some new feature. The new round pins just out, in which gold and platinum are associated with pleasing effect, promise to supply not only a unique ornament for those in search of something novel, but a very attractive brooch for conservative people as well. These pins are wrought in elaborate designs that exhibit platinum and gold in chased and Roman finish, all in one specimen. With other patterns appears the favorite knot design which is peculiarly adapted to this attractive combination of ornamentation. The same idea is carried out in cuff buttons, and as the result is both pleasing and novel, there is little or no doubt about the favor with which these goods will be received.

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THIS association of gold and platinum, while by no means a new combination, is being employed with new effects on some of the more attractive new goods. In addition to the brooches and buttons just described, are Queen chains and bracelets showing alternate links of platinum, and plain or satin finish gold and antique chasing. This triple decoration is also carried into scarf pins and sleeve buttons for gentlemen's wear with pleasing results.

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AMONG the new things open to the spring trade, is the curved chain bracelet that fastens with a patent snap and does away with any box or joint, thereby producing a bracelet flexible in every part. It is claimed for this snap, in addition to the merit already mentioned, that it is both safer and cheaper than most other modes of fastening. This snap, by the way, can be applied to any style of flexible bracelets.

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QUITE new, too, are the double vest chains for gentlemen's wear, in antique patterns that are carried out with faithful fidelity, is both the form and ornamentation of the entire chain, from its bar through to the swivel. A silver one seen had a small antique coin of irregular shape swinging from the center as a charm, and the whole affair had

received the required effect of light and shade by oxidizing. Gold chains made after antique designs are finished in a rugged sort of fashion that accords well with the character of the design.

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BEFORE dismissing the subject of watch chains for gentlemen's wear, mention must be made of the double or Charles Dickens' chains in platinum and gold, which show sometimes alternate links of the two metals, or, again, twisted links in which these metals appear.

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THE tendency to a combination of bright and oxidized finish in silver jewelry, alluded to last month, is now quite apparent in many of the newer productions. Effective illustrations of this combination are afforded in cuff buttons, one-half of which may be bright and the other half showing antique chasing. Queen chains are made bright while the ball or cube is oxidized, or *vice versa*, as pleases best. Then there are round silver pins which show both plain and oxidized finish in the one article. The combination is quite pleasing in such designs as the knot or basket and braided patterns.

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EFFECTIVE novelties that become popular abroad are sooner or later reproduced here. A notable example just now attracting the attention of the trade, and made in faithful copy of the Paris samples by a New York firm, is the "Oudja," an amulet of Egyptian origin dating back to the time of the Pharaohs. This unique charm, which was described some months ago in THE CIRCULAR, is enjoying an extraordinary patronage in both London and Paris. The secret of its success lies, perhaps, in the old superstition that it is an emblem of good luck. The name, "Oudja," signifies health and happiness, and, according to the legend handed down with it, every one who wears it will be attended with prosperity. The "oudjas" made in Paris are copies of old Egyptian amulets in the Louvre and the British Museum, and, as has already been told, the oudjas produced here are copies of those made in Paris. Examples seen at the manufacturer's are effective little ornaments measuring about three-fourths of an inch in length, half an inch in width, and thick enough to admit of decoration on both sides. These oudjas represent the eye of Horus, or rising sun, from which tears drop, in a gold framework of Egyptian design. These oudjas may be worn by either sex on the watch chain, or by ladies on their bracelets.

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A RETAIL dealer up-town, who was interviewed as to the probable success of the oudja in this country, expressed the opinion that well made and effectively finished, these charms are a unique and taking little ornament that ought to have a big run. An imported oudja seen contained an almond-shaped eye enameled in colors true to nature, the tear drops being simulated with small diamonds. Already there appears a disposition to employ the oudja as a parting gift, a sort of *bon voyage*, a graceful way, in fact, of saying "Good bye and good luck attend you."

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IN THIS connection, it may be well to speak again of the padlock bracelets which appear to keep a strong hold on the public, and

which are another illustration of the influence a pretty sentiment wields. The new bracelets, both stiff and chain patterns, are out for the spring trade with antique padlocks showing all the prevailing styles of finish, and costing all the way from \$10 to \$150. These antique locks are evidently veritable copies of old style padlocks and consequently furnish some quaint as well as pleasing effects.

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COFFEE beans, highly polished and mounted in gold, have gained abroad some recognition, and are worn on scarf pins, shirt studs, ear rings and the like. As this fancy has absolutely nothing to recommend it aside from its novelty, it is safe to assume it will have but an ephemeral existence where it originated, and will not be circulated here to any extent. A sample of the coffee bean jewelry seen at an importer's was in form of a round pin, and consisted of three beans on gold stems set in a cluster of chased gold leaves. This brooch was exhibited in a case that simulated a coffee sack or bag.

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IN GOLD jewelry one of the most popular forms of decoration just now is the antique chasing or carving by which very rich and effective results are gained, both with and without gems. This style of ornamentation is especially attractive on cuff buttons, and, as has already been suggested, makes an effective combination with a bright or Roman finish, not only on buttons, but brooches and other articles. Queen chains continue to be one of the most popular things handled by jewelers. The round pin or brooch is all the time gaining ground; bar pins continue good and everybody wears cuff buttons.

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THE little velvet pins which found so much favor last summer, both at home and abroad, when worn on a narrow velvet band about the neck, it is believed, will meet with equal favor during the season to come. These pins are out in a great variety of patterns, and, as they are adapted to a variety of uses outside the original one of wearing on a neck ribbon, are a favorite with many ladies. These pins are often worn as a change, on bonnet ribbons or wherever a small decorative pin may be utilized.

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THE Scotch pebble jewelry which had in New York city such a ready sale during the holiday season will, doubtless, before another six months rolls round, be well known in all sections of the country. New patterns in this jewelry are about ready for the spring trade; patterns designed more especially for summer wear at the seaside and country resorts, but in reality suitable for any season, and likely to take because of their novelty.

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THERE is little that is new to tell about finger rings. Seal rings have naturally called into requisition all sorts of rare intaglios, hence there is exhibited in the choicer seal rings, antique designs representing Egyptian, Etruscan, Persian, Greek, Roman and Arabian art. Ball ear rings are the sort, perhaps, most widely worn after gem rings, and these are pretty enough to tempt the most fastidious. There

are little corrugated balls, balls made of basket work, and balls formed of twists of gold wire tied in knots.

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"NECKLACES are no longer worn," is one of the most frequent expressions that meets the writer's ears, and yet one cannot take up a newspaper without reading descriptions of the *decollete* toilets and inevitable necklaces required by this style of dress, which is worn by both young and old at the opera, receptions and balls. Following are a few of the many necklaces worn at a ball given by Mrs. Ogden Goelet, and described next day by a fashion writer in a leading daily journal: "A magnificent diamond necklace completed Mrs. Goelet's toilet. A pendant, composed of topazes and diamonds, was suspended from a necklace of pearls worn by Miss Chamberlain. The magnificent necklace with pendant worn by Miss ——— was a piece of jewelry of untold value, while her bracelets and ear rings were ablaze with the fire of the immense stones with which they were set. Mrs. ——— wore a necklace of rare device, composed of flat links of gold, a fine diamond being set deep in each link. Mrs. ——— diamond necklace was superb, and suspended therefrom was a medallion pendant containing certainly a score of rare stones." But why continue the list, the moral is evident; don't believe all you hear, but open your eyes and see things through your own glasses.

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A PARIS correspondent in a fashion letter on jewelry, makes the statement that precious gems, such as diamonds, rubies and emeralds, are to be relegated to a secondary position in the French metropolis in favor of stones of lesser value, as tourmalines, spinelles and the like. Without stopping to consider the truth of this statement as it applies to France, it may be worth while to tell THE CIRCULAR'S readers once more that a very free and, at the same time, very good use has been made in this country for a number of years, in fact, ever since the furore for colored gems began—of what are commonly termed "semi-precious stones," in comparison with real gems. But so far as can be ascertained by diligent inquiry, these stones have affected neither the fashion or popularity of stones of greater value. They have simply afforded some very attractive ornaments to people who could not obtain the colored stones desired in the real gems. In a word, the new world has proven wide enough for both classes to prosper. One sees every day beautiful effects gained by the artistic grouping and setting of semi-precious stones, and for these there certainly exists a large patronage. Still the fact remains that people with plenty of money prefer a real ruby to a spinelle, and a fine diamond to a jargon.

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APROPOS of this last statement, may be quoted a paragraph from a recent Washington letter on the gems, rich and rare, displayed at the Washington parties this winter, by ladies representing all parts of the country. "Mrs. Senator Mahone, at one party, wore more diamond ornaments than has been seen on any other one lady at one time; these included necklace, pendant, bracelets and brooch, and ornaments for the corsage of her dress, also ornaments for the hair, all of diamonds. The Brazilian Minister's wife wears a diamond necklace composed of a double row of solitaires; she also wears ear rings, bracelets and other diamond ornaments. The diamond necklace Secretary Whitney's wife wears, is a triple row of solitaire diamonds. The diamonds of the English Minister's wife, heirlooms of the family, show antique settings. Mrs. Townsend, of Philadelphia, decorates her corsage with several diamond pins, and wears a collar of

jewels formed by a necklace of single stone diamonds, below which falls several strings of pearls; below these a necklace of rubies linked together with small diamonds. She has ear rings of large pearls set in diamonds. Mrs. Secretary Whitney has a wonderful diamond necklace, consisting of three strands of fine stones. Mrs. Senator Hale, from Maine, wears a necklace of diamonds and pearls with ear rings and bracelets to match. Mrs. Senator Stanford's diamonds, of which she has four sets, including necklaces, brooches and ear rings, are valued at \$1,000,000."

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THE consideration of semi-precious stones naturally suggests white stone jewelry. White stones, properly cut and artistically mounted, furnish jewelry that is worn by a much larger class of people than the average observer is aware of. It not only supplies the stage with much of the glitter admired by the audience, but affords to many in the audience the ornaments they wear. In a word, many people who cannot well afford the luxury of real diamonds, content themselves with the best class of imitation stones, but they want the best, and the jeweler who sells any other is doing serious injury, not only to himself, but the trade generally. Thin white stones with foil backs, mounted in clumsy 8 karat gold setting, is a delusion and a snare and dear at any price. In making selections, therefore, it is advised to deal only with trustworthy manufacturers who cut and polish their stones as carefully as does the diamond cutter, and mounts them in fine gold settings of delicate and attractive workmanship.

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THE same remarks hold true regarding imitation pearl jewelry, rolled gold and silver plate. The sooner retail jewelers practice selling only the best grades of these goods, the sooner will the competition with dry goods stores and fancy stores be ended. Patrons will soon learn that it is to their interest to seek these goods where only the best is in stock, and to fight shy of inferior qualities that cannot be warranted by the ones who sell it.

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IN BLACK onyx have appeared recently a number of beautiful things. Flower pins, in both dead and bright finish with pearl or diamond centers, are attractions in way of brooches, and simulate the formation of the flower they are intended to represent to nature, in all respects save that of color. For Queen chains, in onyx and gold, there appears to be an increased demand, and the same is reported of bracelets. In this connection may be described some new round pins for mourning, made in flower patterns in fine gold and enameled in black. Some exceedingly graceful and dainty effects have been gained in this direction, especially when the flowers represented have been composed of long, narrow and curved petals with little gems for stamens.

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THE crape stone jewelry, which has gained a widespread popularity, is, as many of our readers already know, designed especially for persons in mourning, and presents a corrugated surface that imitates closely English crape, not only in its hue and sheen, but its peculiarities of texture and finish. This jewelry is made in two grades. Crape stone of the first quality is made from onyx, which is cut with tools and abraded with acids to produce the crape-like corrugations, and then colored a lusterless black. The second quality of crape

stone jewelry is made of silicious compounds with mineral fluxes, and is formed in molds. Crape stone buttons for black dresses are formed in the same manner. The first-class crape stone jewelry is susceptible of elaborate decoration, and is made up in lace pins, round pins, flower pins, bracelets, watch chains and other articles seen in fine gold jewelry. It is made both plain and set with gems, thereby affording a wide field for selection.

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IN STERLING silverware there appears no special innovations or abrupt changes. The best manufacturers continue to indulge in a wide license as regards the finish of their wares, often combining several styles in one piece, as bright finish and chasing, fluted and engraved, satin and bright, etc., etc. The inclination is, however, toward *repoussé* work in old English patterns with the white finish. This occurs often in tea sets of antique patterns and low forms, and is a favorite in manicure and toilet articles as well. The object appears to be, all the while, more and more the expression of genuine art work, which makes an observer forgetful of any special style or fashion, as well as unmindful of the exact avoirdupois of the object.

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THE fact that silversmiths are now producing some of their best designs, and bestowing elaborate and expensive ornamentation on such metals as brass, copper and iron, speaks volumes for the progress that has been made and the growing appreciation of art work. Some of the most attractive coffee pots and urns, tea caddies and the like, seen this month, have been of brass, iron or copper. The shapes are unique, the handiwork elaborate and careful. The copper ware shows that peculiar glossy smooth finish due to the present popular mode of treating copper. The brass is much of it made in fluted patterns, and the iron ware is often beautifully decorated with silver ornamentation. All the table ware is, of course, lined with silver, and the coffee pots not unfrequently show stained ivory handles.

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THE sealing sets in silver, copper and brass, have proven popular beyond the fondest hopes of the manufacturers, and as these are furnished in such a wide diversity of styles and grades, there appears no reason why they should not be on the shelves of every retail dealer in the land. An attractive style is represented in the sets that include a tray on which rests a lamp or candlestick, a seal and the wax.

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THE solid gold tea and coffee service on a massive gold tray, that has been figuring so conspicuously in Washington at the dinners given by Senator Stanford, of California, has created almost as much talk as has Mrs. Stanford's jewels. This gold service is by no means an isolated case of royal magnificence in table ware. Gold dessert plates beautifully wrought, with gold compote and other dishes, are manufactured to order by firms that cater to an exclusive trade, and are kept in stock in limited supply. Silver plates are of more frequent occurrence, and these cost enough to paralyze ordinary people.

A set of twelve, made recently to order, and decorated with the *repoussé* white finish in English designs, cost \$1,000.

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SUCH little trifles as silver sea shells lined with gold and tinted to nature, for salt cellars, or individual olive dishes in form of silver leaves, are luxuries indulged in much oftener. Indeed, there appears to be a growing tendency to these individual small dishes in artistic designs, and there are many attractive things in this direction. These smaller luxuries are oftentimes bought by people of comparatively moderate means for presents, and consequently are furnished in sets of from two to twelve, put up in appropriate cases.

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THE demand for favors, prizes for progressive euchre parties, etc., has doubtless had a tendency to increase the number of small novelties in silver, such, for instance, as tiny silver baskets, silver eggs containing a drinking cup, silver whistles, envelope openers and silver calendars. These envelope openers, by the by, are popular wherever known, not only for the purpose of opening letters, but using as a paper cutter and book marker by readers of periodicals and other uncut matter. As these can be made at a small cost, there appears no reason why they should not find a popular patronage all over the country. Very pretty ones of sterling silver were sold during the holidays for \$1.50 each.

ELSIE BEE.

The Jewelers' League.

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First Vice-President, WM. C. KIMBALL..... Of H. F. Barrows & Co.
Second Vice-President, AUG. KURTZBORN..... Of L. Bauman Jewelry Co. St. Louis, Mo.
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THE JEWELERS' CIRCULAR is the *exclusive* official paper of the Jewelers' League, and has been selected for the publication of all matters of interest pertaining thereto. Letters or inquiries pertinent to its business or purposes, and which might interest the trade or inquirers, will herein be answered. Address *Jewelers' League*, Box 3,444, P. O., New York, or the office of THE CIRCULAR.

At the regular monthly meeting of the Jewelers' League held Feb. 5, there were present Messrs. J. B. Bowden, E. S. Smith, J. R. Greason, G. R. Howe and W. L. Sexton.

Upon motion of Mr. Bowden Mr. G. R. Howe was unanimously chosen Chairman of the Executive Committee for the present year.

Six (6) changes of beneficiary were granted.

Notice of proposed change in the Constitution and By-Laws was submitted by Mr. J. D. Yerrington, viz.: to limit the age of membership from 21 to 45 years instead of 40 years, as passed at the last Annual Meeting.

An assessment of six (6) dollars was ordered on account of the deaths of H. H. Henning and Saml. McC. Miller, of San Francisco, Cal., and Chas. Schlag, of N. Y. City.

Two applications were rejected.

Ten applications were referred.

The following were admitted :

W. Walther, P. Horneck, Jr., New York, N. Y.; E. B. Ingraham,

Providence, R. I.; C. C. Wagner, Allegheny City, Pa.; E. C. Purkey, Allegheny, Pa.; E. P. Happich, Philadelphia, Pa.; M. Young, Chicago, Ill.; G. C. Hasslinger, St. Louis, Mo.; F. Stupl, Columbus, Texas.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of January 12, 1886.

- 334,068—Clock Escapement. C. Becker, Sr., New Rochelle, N. Y.
 334,012—Clock Gong and Bell. G. Gardner, Winstead, Conn.
 334,179—Watch, Stem Winding and Setting. H. A. Lugin, New York, N. Y.

Issue of January 19 1886.

- 334,517—Clock Movement, Electric. S. C. Dickinson, Wilton, Iowa.
 334,525—Timepiece Dial. A. O. Gott, San Francisco, Cal.

Issue of January 26, 1886.

- 334,844—Bracelet. A. V. Briesen, New York, N. Y.
 334,745—Clock, Electric. J. E. Carey, New York, N. Y.
 334,822—Clocks, Electro-Magnetic Device for Winding. W. F. Sweet, Grand Rapids, Mich.
 334 886—Screw Driver, Watchmaker's. O. L. Neal, Waltham, Mass.
 334,749—Watch Movement. P. Conner, Farmington, Ill.

Issue of February 2, 1886.

- 335,455—Watch Case Pendant. B. F. Hope, Sag Harbor, N. Y.
 335,471—Watch Winding Mechanism. C. Morlet, Assignor to himself and P. Nordmann, New York, N. Y.

Issue of February 9, 1886.

- 336,004—Clock System, Electric. F. E. Fisher, Detroit, Mich.
 335,860—Clock System, Electric. C. D. Warner, Ansonia, Conn.
 335,746—Jeweler's Box. D. F. Duber, Brooklyn, N. Y.
 336,846—Watch Crowns, Manufacture of. E. L. Smith and E. A. Hitchcock, New Haven and Waterbury, Conn.
 336,060—Watch Regulator. W. W. Owen, Columbus, Ohio.
 335,731, 335,732 and 335,733—Watch Stem, Winding and Setting Attachment. H. Abbott, Newark, N. J.
 335,666—Watch Winding Indicator. A. G. Wiseman, Webster Groves, Mo.

Solders and Soldering in the Practice of the Goldsmith.

[By PAUL HIEHLE, in *Journal der Uhrmacherkunst*.]



ALL TRADES, engaged in the working of the metals, make use of certain kinds of alloys, specifically termed "solders." No other trade, however, so unconditionally requires as good and reliable a solder as the goldsmith, for the simple reason because in no other trade can the damage inflicted by a bad or inferior solder be as great as here. The author thought it therefore proper to offer a collection of recipes for the composition of the different solders, which have proven themselves to be good and reliable in practice.

I.—GOLD SOLDERS.

The different alloys of gold largely vary from each other, as far as regards their color and their points of fusion. This decreases at the

same time with the percentage of gold, and its color also becomes paler in the same manner. For this reason different solders will invariably be required for articles of finer gold than for those of inferior gold.

They are either composed from gold and silver, gold and copper, but, in the majority of cases, from a mixture of these three different metals in definite proportions, according to the purpose for which to be used. In certain cases an addition of zinc is made to the alloy, to make it quicker fusible: this can be done only, however, when the articles to be soldered therewith are neither to be colored nor enameled.

First, because these solders are apt to "eat" if repeatedly exposed to glow heat; again, because such an alloy would in coloring assume a black color.

For articles which are to be enameled, alloys are invariably used consisting either only of gold and silver, or, at most, of gold, silver and copper; these alloys are for short called "enameling solders."

Fine gold as solder.—It is not very long ago since it was discovered how to produce a degree of heat high enough to melt platinum; whenever this became necessary in the chemical factories which use platinum vessels these were soldered with fine gold, which was for this purpose employed in form of thin wire or thin strip of sheet laid along the joint, and then soldered in the fire in the ordinary manner. A strong white heat is necessary to use fine gold direct as solder, as it is with difficulty reduced to fusion, and even with this temperature it remains semi-fluid, so that the proper soldering requires a great skill of the workman, and the result is after all dubious and uncertain.

For this reason the actual solders are preferred, and I append several recipes of the best mixtures. All the metals entering into the composition mentioned are of the standard called "fine" (gold = 24-k., etc.), unless otherwise stated.

A. Gold solder for 18 karat (.750 parts fine) gold.

No. 1. Hard solder, fairly hard fusible, to be used for first-class goods: 18 karat gold, 9 parts; silver, 2 parts; copper, 1 part.

No. 2. More easily fusible solder, which can also be used for first-class goods, similar to No. 1: 18 karat gold, 3 parts; silver, 7 parts; copper, 3 parts.

B. Gold solder for 14 karat (.583 parts fine) gold.

No. 1. Hardest, for first soldering: 14 karat gold, 3 parts; silver, 2 parts; copper, 1 part.

No. 2. Softer, for second soldering: 14 karat gold, 4 parts; silver, 1 part; copper, 1 part.

C. Gold solder for ordinary goods below 14 karats.

No. 1. Gold, 1 part; silver, 2 parts; copper, 1 part.

No. 2. Gold, 1 part; silver, 2 parts; copper, 2 parts.

D. Easily fusible gold solder for repairing.

Gold, 12 parts; silver, 55 parts; copper, 28 parts; zinc, 5 parts; or, 18 karat gold, 10 parts; silver, 5 parts; zinc, 1 part.

E. Gold solder for articles to be enameled.

No. 1. Hardest fusible: gold, 37 parts; silver, 9 parts.

No. 2. Hard fusible: 18 karat gold, 16 parts; silver, 3 parts; copper, 1 part.

No. 3. Hard fusible: 18 karat gold, 16 parts; silver, 9 parts.

No. 4. Easily fusible: 18 karat gold, 16 parts; silver, 3 parts; copper, 2 parts.

F. Gold solders to be used for articles to be colored.

No. 1. Hardest fusible: gold, 40 parts; silver, 38 parts; copper, 19 parts.

No. 2. Hard fusible: gold, 3 parts; silver, 2 parts; copper, 1 part.

No. 3. Easily fusible: gold, 1 part; silver, 2 parts; copper, 1 part.

It cannot be stated definitely which of these solders is adapted for each definite purpose, but is left to the intelligent judgment of the workman, to use in each particular case the solder best suited. It is only necessary to make a few additional remarks. When articles are

to be enameled, the fusibility of the solder depends upon the fusing point of the enamel. In case that this is very hard fusible, then the solder specified under heading E, No. 1, can only be used; otherwise it might happen that during the fusing of the enamel the joints of the article might become unsoldered. But it is well at the same time to remember that only easily fusible enamels are used in the manufacture of ordinary jewelry, and a more easily fusible solder can in such cases be used without jeopardizing the article.

II.—SILVER SOLDERS.

Silver solders are used not alone for soldering silver articles, but also for joining all other metals, principally on account of their great toughness and firmness, especially in cases where the soldered articles are subject to great strain or pressure. The remarks made about gold solders also apply to silver solders. The most usual compositions for silver solders are about as follows: Hardest silver solder for 14-part silverware: silver, 4 parts; copper, 1 part.

A. Silver solder for 12-part silverware, hard, for first soldering.

- No. 1. Silver, 6 parts; brass, 3 parts.
- No. 2. Silver, 19 parts; copper, 1 part; brass, 10 parts.
- No. 3. Silver, 20 parts; copper, 1 part; brass, 9 parts.
- No. 4. Silver, 28 parts; copper, 2 parts; brass, 10 parts.

The zinc percentage varies in these compositions between 6—11 per cent. of the whole, and that of the copper between one-quarter to one-half of the silver; zinc and copper together from one-third to three-fourths of the silver.

Softer silver solder, to be used for second or subsequent soldering.

- No. 1. Silver, 2 parts; brass, 1 part.
- No. 2. Silver, 1 part; brass, 1 part.
- No. 3. Silver, 3 parts; copper, 2 parts; zinc, 1 part.
- No. 4. Silver, 7 parts; copper, 3 parts; zinc, 2 parts.
- No. 5. 12-part silver, 19 parts; zinc, 3 parts.
- No. 6. Silver, 10 parts; brass, 10 parts; tin, 1 part.
- No. 7. Silver, 12 parts; copper, 4 parts; zinc, 1 part.

In consequence of their characteristics, these solders are used principally for the final soldering of articles which have been soldered previously with a hard solder; they may also be used for repairing defective spots, always using for this purpose those compositions containing the highest percentage of zinc.

I will conclude by specifying two very easily fusible solders, well adapted to serve in desperate cases, when the repairer nevertheless does not like to make use of tin solder. It must be borne in mind that these solders should be used only in places which are with difficulty reached by others, as they are rather brittle and given to breaking. They are composed as follows:

Very easily fusible silver solders for repairs.

- No. 1. Silver, 5 parts; brass, 6 parts; tin, 1 part; zinc, 2 parts.
- No. 2. Silver, 60 parts; brass, 60 parts; zinc, 5 parts; tin, 1 part.

When composing the different solders, care must be taken to have the metals used for them absolutely pure and free from foreign admixtures; the most minute quantity of iron already suffices to render them brittle, and to make them very sensitive to the strokes of the hammer.

The Electro-Gold Plating of Watch Parts.



AN INTERROGATOR in the *Deutsche Uhrmacher Zeitung* complains that the watch parts he is gold plating will not assume a nice, bright color, and asks for advice. Mr. O. Behrends answers as follows in the same periodical:

The ill-success in gold plating is generally due to circumstances, so trifling that they are apt to be overlooked, and for this reason it is often difficult to find the offending cause that occasioned the

trouble; but still more difficult is it to specify it without a personal examination of all the single parts.

The interrogator says that the first pieces were handsomely gilt. This is the best evidence that everything was in good order, and entitles us to conclude that equally good results should in the future have been expected, if no alteration was effected meanwhile with the element or bath, or that a new bath has been substituted. To judge from the expressions of the interrogator, this is not the case, and I therefore will endeavor to point out a few features calculated to produce a disturbance.

It is of chief moment for the good success and handsome color of the gilding, that the articles subjected to this manipulation be thoroughly cleansed, rinsed, and scratch-brushed. These processes have repeatedly been described in divers publications, and I will simply state at this place, if the gilder desires to dispense with the preliminary silver graining, the cleanliness of the article *must* unconditionally be beyond question. An imperfect cleansing produces a dirty color of the gilding. We will find this frequently demonstrated on watch barrels, the interior and exterior of which have been insufficiently cleaned, in consequence of which said barrels frequently turn black.

When preparing the chloride of gold, great attention must be paid to entirely evaporate the acid, or if, in place of the chloride, the ammoniacal oxide of gold is used, then that the precipitate is well washed and filtered, so that no trace of acid is carried into the bath. If this bath contains any acid the articles suspended in it will turn black. This can only be explained by the occurrence that the copper wire will become covered with verdigris, which, however, has never yet happened to me, and theoretically I cannot explain it in any other manner. It is advisable to only use covered conduit wires, by which their repeated cleaning is dispensed with.

The elements must, from time to time, be cleaned in all their parts, and the clamps, screws, etc., are to be rubbed off with emery paper, since otherwise the strength of the current is deteriorated. When the battery is not to be used for a length of time, it is advisable to pour off the liquid, and to store it separately.

Before each use of the elements it is necessary to be satisfied that everything is in due working order, and the electrical current is generated in sufficient strength. This test is most easily performed by bringing the ends of the conduits for a moment in contact. An electrical spark will pass over if the current is sufficiently strong. If it does not, then the current is either too feeble, or there is none at all, and the reason must be looked for, which will generally be found due to foreign bodies, such as dirt, or collections of metallic solutions or salts, or to too great a porosity of the cells, mutual contact of the generator or its conduits; beside this, it may also be owing to the bad condition of the filling of the element.

When a bath has remained standing for some time it is advisable to boil it; it may also be employed in a warm condition. The precipitation in a warm bath will be more rapid than in a cold, but it will not be as uniform, and the cathode, as well as the anode, must constantly be moved to and fro in it. But when gold plating only a few articles at a time this occasions no difficulties.

Again, the magnitude of the surface of the anode to that of the cathode, as well as the mutual approach toward each other, must be fully considered. Too great a proximity, or too great a magnitude of surface of the anode, produces too rapid and too strong a precipitation, which will also be produced by too strong a current and too great a percentage of gold in the bath. The articles in the process of gilding soon begin to color a dark red or dark brown, but when the distance between the anode and cathode is either too large or too small, or that the current is too feeble, or the gold percentage of the bath almost exhausted, the precipitation will then be too slow and too thin, or else there will be none at all, and the articles assume a dirty, dead, and spotted color.

There is another probability: that your bath contains either too much or too little cyanide. All these defects can be ascertained

only on examination, and corrected by adding one or the other of the components wanted.

Articles which have assumed an "off-color" in the bath must be carefully scratch-brushed until it has entirely disappeared; if necessary they are to be ground anew, thoroughly cleansed and grained.

The above are about the principal vexations of the bath and current, and if the interrogator will devote a little time to the study of his bath and current, he will soon find where the blame is due.

Hearing.

[BY DR. C. A. BUCKLIN, NEW YORK.]



THE EAR and its diseases come quite as near being a question of pure mechanics as the eye and its refractive disorders. This subject is therefore one which falls within the ready comprehension of the readers of THE JEWELERS' CIRCULAR, for, taken as a class, they are a body of the most skilled and practical mechanics. I therefore, at the request of one of our most enthusiastic readers, devote a short space to explaining the philosophy of hearing, and how it is made defective. To illustrate a primary principle in sound, let us suppose the following experiment: We place upon a table tuning forks representing every note of an octave. We should have several octaves, but one will answer our purpose for illustration. Let us take one tuning fork, corresponding in tone to one we already have in our collection; we set the tuning fork in vibration in our hand, and then suddenly stop it, when behold! we find that the tuning fork of our group which corresponds to it is vibrating. Every time we strike a note which corresponds to some note in our collection of tuning forks, we find that the proper fork becomes noisy in response, while the others remain quiet. Imagine every filament of the nerve of hearing terminating in a small body, which corresponds to a tuning fork. These little organs are in a fluid in a closed, bony cavity, the only opening into which is covered by an elastic membrane. This cavity is called the *internal ear*; with it we are ready to receive any impressions which vibrations of the atmosphere may communicate to us, and to determine their number and length by the impressions conveyed to the brain, as this, that, or the other organ is called into vibration. It will be remembered that Edison has illustrated in a practical way that any sound can be produced by a given number of vibrations of a given length; thus a given number of vibrations of a given length, recorded on the audiphone, will always reproduce the same sound. The vibrations carried to the brain by the auditory nerve enable one to discriminate to a great exactness musical tones, which discrimination consists of an unconscious mental calculation as to the number and length of these vibrations. There is no multiplicity of tones which cannot be differentiated by the ear and taken cognizance of by the human brain. The receiver for this telephonic apparatus between our brain and external atmospheric vibrations is complete, and sufficiently clearly illustrated for the mechanical mind by the above description. It does appear strange that we should be *so slow* in following the example of a bright-minded Creator in the construction of the telephone.

Having commenced with that portion of the auditory apparatus which gives us correct impressions of what is going on in the external world by receiving, sorting, and distributing to our intellect the nature of the vibrations which vibrating or moving objects impart to the surrounding atmosphere, we will next consider the mechanical contrivances which are used in bringing these vibrations of the atmosphere in proper contact with these organs, which are so ingeniously devised for receiving, counting, and measuring them. The theory of hearing being once practically understood, an intelligent appreciation of the diseased conditions which make it defective is very interesting and easily acquired.

To illustrate practically the middle ear, we will compare it to a

small drum, one head of which seals the cavity containing the organs in which the filaments of the nerve of hearing terminate; this head of the drum will have fluid in contact with one surface, and air in contact with its other surface. The other head of this drum will have its external surface exposed to receive the vibrations of the atmosphere. An equal atmospheric pressure is maintained on the internal surface of the drum membrane by a vent, which receives air from the throat through the eustachian tube. One will readily see that, as one head of this drum is perfectly free to vibrate with atmosphere of an equal pressure on both sides of it, and the other head is in contact with fluid on one side, it would be impossible to make this second head respond promptly to the rapid vibrations of the first head, if the only means of communication between them were atmosphere. To obviate this difficulty, a little chain of jointed bones is placed between the two heads; the jointing is of such a universal nature, that while it in no way prevents perfect freedom of motion of the free head of the drum, every possible vibration is carried through this chain of bones by direct contact to the head, closing the cavity which contains the organs for measuring the nature and number of the vibrations.

The external ear is simply for gathering and directing the sound waves against the drum membrane. Now let us, in review, trace a sound wave from its origin to our intellectual recognition, and then we will be in condition to see how this transmission could readily be interfered with. A dog barks; the air is set in vibration; these vibrations are directed by the external ear against the ear drum, and a perfect register is made of the number, length and strength of the vibrations. They are carried by direct contact to the fluid of the internal ear, the appropriate nerve terminations are called into activity, and we immediately judge as to the nature of the sound, the kind of a dog, his position, distance, etc.

Commencing with the *external ear*, hearing may be made defective by foreign bodies getting into the ear; ear wax may completely block the canal; a small piece of wax may become attached to the drum, and seriously interfere with the delicacy of its vibration. A boil may form in the walls of the ear canal, and so swell the lining-membrane as to completely exclude the sound-waves from the ear. These conditions form only a small part of what is known as ear diseases.

We next come to the middle ear, and here we find over ninety per cent. of all ear diseases are located.

Acute inflammation of the middle ear—after the ear has inflamed, and the puss which filled the middle ear has broken through the drum, the disease is commonly known as a running ear.

It happens thus: The individual has scarlet fever, nasal diphtheria, a severe cold in the head, or has been exposed for some time to a severe draught upon the ear. The membrane lining, the cavity of the middle ear, begins to inflame, the tube leading to the throat becomes swollen, so that air cannot reach the cavity of the middle ear; the swollen tube, acting as a check valve, a few efforts at swallowing exhausts the air from the middle ear, and we have an inflamed membrane, the blood vessels of which are in a vacuum. The result of this can be illustrated by sucking the air away from a circumscribed portion of the skin with your mouth; the blood vessels become engorged and the spot very red. Under these conditions, fluid rapidly passes through the walls of the blood vessels, completely filling the cavity of the middle ear. The pain is usually very severe; rupture through the drum membrane takes place in a few days, usually, greatly to the relief of the sufferer. Occasionally a severe inflammation of this kind extends to the brain, and produces death. Heat externally to the ear, and applied to the ear internally by means of a stream of hot water, greatly relieves the severe pain. The tube leading to the throat should be frequently cleared out by the air blast, the ear kept perfectly clean, and a tonic of chloride of iron and chlorate of potassa should be given with this treatment. Carefully carried out, these cases are usually brought to a satisfactory termination.

In the above condition we have supposed that there was an acute inflammation, which invaded the middle ear. I think this condition of affairs is treated intelligently by all physicians who understand the ear.

Chronic catarrhal disease of the middle ear is the cause of about seventy per cent. of all the incurable diseases of the ear. It is the most insidious in its development, and consequently does the greatest amount of permanent damage before it attracts attention.

The condition is produced in the following manner: An individual has a chronic nasal catarrh, caused usually by a pair of enlarged tonsils, or an obstruction in one or both nostrils, which prevents the free passage of air through the head at all times, or at least every time the individual takes the slightest cold.

This slight or complete obstruction of the nostril is one of the most common causes of chronic catarrh, which leads to incurable deafness. As soon as we fail to breathe the usual number of cubic gallons of air through the nose, the normal secretions necessary to keep the nose from becoming dry are no longer evaporated. They collect, decompose slightly, make the breath unpleasant, and they run down into the throat, causing a continual hawking or discharge from the nose. This chronic catarrh, causing a thickening of the membrane about the opening leading to the ear. The efforts of swallowing pump the air out, and the effect upon the ear is the same as if you suck the air out from a small drum through the vent, and then place your finger quickly upon the opening.

One blast of air through the eustachian tubes when this accident first happens, restores the hearing, but as the air is quickly exhausted again, the bad hearing returns. The only way to benefit a case of this kind permanently is to insist on having a perfectly free passage through both nostrils, which will not close every time one catches a slight cold in the head. The great difficulty in treating this form of disease is the inability to keep the opening leading from the ear to the throat open at all times for the free passage of the air.

The obstruction of either nostril, large tonsils, the slightest fullness, noise or unpleasant sensation in the ear, should receive prompt and careful attention.

It is certainly plain to see how these conditions can impair the hearing. Diseases of the internal ear are comparatively rare, and frequently incurable.

Catarrhal deafness is *the* disease one should guard against.

Gossip of the Month.

THE practice indulged in by some manufacturers and jobbers of selling goods to outsiders, comes in for a liberal amount of attention at the hands of our correspondents this month. It seems to be the greatest evil the retail dealers have to complain of. The manufacturer and jobber who, in our February issue, over the signature of "New Blood," boldly announced his determination to sell to anybody who had the money to pay for his goods, comes in for a good share of criticism, but we observe that none of his critics offer any reply to his charge that the retail dealers had nearly ruined his trade by buying cheap imitations of his goods when they knew them to be fraudulent. There can be no valid excuse made for the practice of selling to outsiders by those who also expect to sell to the retail trade, but there are two sides to the question, and the grievances are not all with the retail dealers. These latter are as much bound to protect manufacturers and jobbers in their rights as these are to protect them. Two wrongs never yet made one right. "New Blood's" statement of how he was robbed of the advantages he ought to have derived from a patented article, because retail dealers preferred a cheap imitation of it, is by no means an isolated case. Nor can any legitimate excuse be found for those jobbers, complained of by one correspondent, who are sending out catalogues to all the

cross road dealers, soliciting orders from them, and thus setting them up as competitors of the legitimate retail dealers. There are many trade abuses that need correction, and we trust the day is not far distant when some kind of a national association, representative of all interests, will be formed to take cognizance of them all and adopt methods for reforming them. Meantime, the best thing to be done is to ventilate them through the columns of THE CIRCULAR.

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MANUFACTURERS are considerably given to crowing, but we were not aware that any of those in the jewelry line were also interested in poultry. Yet at the poultry show at Madison Square Garden early last month, a firm of silverware manufacturers offered an elegant silver cup to the artificial incubator that hatched out the greatest number of chicks during the week of the show. It made the liveliest contest in artificial hatching that has ever taken place, as a large number of incubator makers were on hand with their machines and competed for the prize. It was awarded to the machine that hatched 81 per cent. of the eggs put into it. The cup was an elegant affair, silver, surmounted by a cock and hen, and appropriately engraved with poultry emblems. It stood sixteen inches high, and was valued at \$100.

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WE HAVE received a lengthy communication from a member of the Jewelers' League, pointing out what he claims are some defects in its methods. While the communication is intelligently written, and the writer unquestionably has the best interests of the League at heart, he, nevertheless, has based his article upon certain misconceptions which have led him into making several misstatements. Having laid a faulty foundation, the superstructure he has erected thereon cannot stand. For this reason we must decline to print his letter. His statement, however, that justice cannot be done the members unless equality and equity are maintained between them is entirely accurate; that in order to secure the permanency of the League for all time, certain changes in methods are necessary, is conceded by those who have given the most time and study to its affairs. It is the purpose of its founders, and of those in authority, to establish the League upon such a solid foundation, that the successors of the present members, generations hence, may enjoy its advantages. To this end certain amendments to the By-Laws have been introduced from time to time; some of these have been adopted and others rejected, but there is hope that the continued agitation of the subject at the annual meetings and elsewhere will result eventually in placing the League upon as firm and substantial ground as is occupied by any life company in the land. If our correspondent will call upon any member of the Executive Committee or the officers of the League, and inform himself upon certain matters that he criticises, he will find he has been misled. Lest his communication should mislead others, we abstain from printing it. The League has done, and is doing, a vast amount of good among those in the trade who need just such benefits as it confers, and it is manifestly unfair and unwise for members to close their eyes to its great beneficences because of any minor defects they may think they see in the details of its work. All great works are open to criticism, but that is no reason why we should seek to discredit or destroy them. We trust our correspondent will take occasion to inform himself more accurately regarding the workings of the League and write us again. We shall take pleasure in seconding any effort that is honestly intended to benefit the League, tend to perpetuate it, and to positively guarantee the benefits promised, even to the last man.

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THE month of January and the first two weeks in February were remarkable chiefly for the disagreeable weather they afflicted the

community with. Cloudiness and rains prevailed principally, except when snow fell or an intense cold wave swept the country. Then came a "clearing up" storm of rain that lasted two or three days, the rain falling in torrents, filling the rivers to overflowing and precipitating widespread floods that inflicted great damage to property. Of course, but little business was done under such circumstances, and the anticipated dullness of a dull season was intensified. Still, we found those in the trade who declared their business averaged "fair to middling," and that they had no cause for complaint considering the season of the year, while the chronic grumblers complained that they "never saw trade so dull." Strike an average between these extremes, and the condition of trade will be fairly indicated for the past two months. There is hope for something better during the present month, but no "business boom" need be anticipated, at least until Congress adjourns.

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GOVERNMENT four and a half per cent. bonds recently sold at 125, on which basis the investment would yield the purchaser less than three per cent. on his investment. This is one of many indications that capitalists are not satisfied with the financial outlook of the country, and prefer to put their money in safe investments at small profit, to investing in business enterprises that may be ruined by the legislative cranks in Congress. If Congress would but listen to the demands of trade and commerce and give us a fixed, honest currency on a gold basis, instead of the cart wheel silver dollars worth eighty cents, a great impetus would be given to enterprise and business of all kinds. The millions of capital now tied up in securities yielding a low rate of interest, would be speedily turned into the channels of trade, and a "business boom" set going that would bring solid substantial prosperity to the country. When the rate of interest averages but three to four per cent. on safe securities, there is such a curtailment of the income of capitalists that they would be glad of the opportunity to put their money into business and take the chances of increasing their receipts if they could do so without jeopardizing interest and principal as well. Congressional demagogues have an unfoolish habit of tampering with the currency, the tariff and other matters affecting business interests at every session, and so throwing a wet blanket upon enterprise. If Congress could be restrained from meeting oftener than once in five or ten years it would be a blessing to the country.

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THE United States Senate is Republican, and, consequently, inclined to oppose the present administration. The President has seen fit to remove some Republicans from office, as it was expected he would do, and the Senate declines to confirm many of the President's appointees, on the ground that the removal of the old officers was a reflection upon their integrity and capacity. The Senate asks for all papers relating to such removals, and the President refuses to yield them unless they are to be considered in open session of the Senate. Thus the spectacle is presented of the two great political parties of the country locking horns over a few paltry offices, indicating that the control of Federal patronage is the aim and object of all politicians and the great incentive to the acquirement of political power. The spectacle is not one to inspire the highest respect for political parties, and no one, be he Democrat or Republican, can look upon it without feeling a sense of humiliation. Yet this struggle is prolonged from week to week, while matters of vital importance to the business interests of the country are ignored. Such a squabble for official patronage might be expected in the New York Board of Aldermen, but is scarcely dignified when indulged in by the Senate of the United States and the executive head of the government. It

should be understood that we are not a nation of office seekers and political wire pullers, but that the great majority of our fifty-five millions of population are active business men, whom no official position could tempt to leave their legitimate and honorable callings.

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A CORRESPONDENT who has evidently been victimized, asks us the following question: "If I sell a bill of goods on the strength of a favorable financial statement verbally made by the buyer at the time of the purchase, and the statement subsequently proves to be false, both as to the assets and liabilities of the buyer, and the bill contracted is not paid, does the creditor make himself liable to a criminal prosecution of any kind." Questions of this kind are constantly arising in the jewelry trade, and, as the law was changed by the adoption of the Penal Code at the legislative session of 1881-2, its present bearing upon the subject should be understood by all. By section 544 of the Code, it is provided that "a purchase of property by means of a false pretense is not criminal, where the false pretense relates to the purchaser's means or ability to pay, unless the pretense is made in writing and signed by the party to be charged." To obtain property, therefore, by means of verbal misrepresentations by the buyer as to his financial condition, does not constitute larceny or any other *criminal* offense. The offense is against the individual and not a matter of general public concern. The fraudulent debtor, however, may be arrested in a civil suit to recover the debt. The number of such fraudulent debtors who have at various times been occupants of Ludlow street jail, has given rise to the impression that in New York the old blue laws for imprisonment for debt are still in force. This is erroneous in so far that before a debtor can be imprisoned fraud must be proved against him. Under the present code, every person selling goods on credit would do well to have a book of forms to be filled up and signed by every person asking credit, for, in the eyes of the law, lying is not an offense unless attested by the autograph of the liar.

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WHILE the press and politicians are wrangling over Attorney-General Garland's ownership of Pan-Electric Telephone stock, and stirring up an agitation as to the validity of the Bell Telephone patents, the only interest the general public has in the subject is involved in the question: "Can the public obtain a better telephone service at reduced cost?" While THE CIRCULAR believes in maintaining the rights of every honest patentee, and recognizing every patent as valid until it is proved to be otherwise, we do object to any great monopoly imposing upon the public simply by reason of its wealth and audacity. It is a well known fact that great improvements have been made in the telephone within the past few years, by means of which better service could be given at far less cost to the public; but all opposition to the Bell Company has been fought off or bought up, till that company virtually monopolizes the entire telephone business of the country. Indeed, it is the boast of the managers of that company that they own telephones that are much better than the ones they force the public to use, and that if they should be beaten at law, they would be able to compete on business principles with any rival, reducing their tariff of charges below any competitor and giving improved telephones. At present they find it more profitable to make the present imperfect and unsatisfactory telephone than to introduce their better instruments. As they claim to own the bottom patent on the discovery of a means to transmit sound over an electric circuit, the only way to destroy this great monopoly, that buys up all competition, is to attack the patent. If it can be shown that this was fraudulently obtained, or that the invention was antedated by some other inventor, the field for telephone service will be thrown open to competition and every user of telephones will be benefitted thereby.

If fraud was practiced upon the government to induce it to issue the Bell patent, it seems proper for the government to take steps to unearth the fraud and protect the interests of the people. This has been done by bringing suit in the United States Court, the government being the prosecutor. It may be indelicate for Attorney-General Garland to own stock in a rival telephone company, but as the prosecution of the suit has been placed in other hands, the fact of his holding stock does not seem to be material to the only issue in which the public is interested, the validity of the Bell patent. The question is: "Shall the public maintain a monopoly of the telephone business, or shall it have better service at less rates?" If the Bell patent was honestly obtained, there ought not to be any serious objection to having the matter judicially determined. Mr. Garland's position may furnish capital for the politicians to shout about, but is outside of the main issue.

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THE movement to make Saturday afternoon a permanent half-holiday is one that should be encouraged and supported by business men in all lines of industry. We are essentially a nation of workers and are wearing ourselves out with overwork. With more recreation we should use up our business men less rapidly, save them from much insomnia, brain trouble and other diseases that come of the constant physical and mental strain they impose upon themselves. Then, too, with our factories running six full days a week, business suffers from over-production; the demand is not equal to the supply. As a consequence, prices are broken and the margin of profit reduced. Then comes renewed effort to sell more goods and increase the volume of business that the profits in the aggregate may be maintained, so that the physical and mental effort required for the transaction of business is being constantly added to. From a purely sanitary standpoint, our business men ought to work less and play more. But business will not suffer from a weekly half-holiday; on the contrary, it promises to introduce new conditions that will be beneficial. Every person, no matter how humble his position, can aid this movement to secure a half-holiday on Saturdays, by inducing his friends and personal acquaintances to abstain from making their purchases on that day. This is the way to reach the solution of the problem. Induce buyers to abstain from purchasing on Saturday afternoons rather than seek to prevail upon sellers to forego their prospective profits.

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THE annual meeting of the National Association of Manufacturers and Jobbers in American Movements and Cases was held in this city on the 9th, 10th, 11th and 12th of February. The sessions were largely attended by members from all the principal cities, while a number who could not attend were represented by proxies. Most of the business was of a nature of little interest except to members, save that several measures were adopted with a view to securing better protection for retail dealers. One of these provides that where a jobber has also a retail store, at least one-half his sales of American movements must be by wholesale to the trade or he will be stricken from the list of jobbers. Another requires all net price lists to be sent to dealers in sealed envelopes. It is recommended that travelers do not take orders for goods, but content themselves with exhibiting their samples and working up a demand for the goods, leaving the dealer free to order through any jobber he chooses. These are all excellent measures, and in the direct line of protecting the interests of the retail trade. For an organization indulging in the celebration of its first birthday, the National Association had reason to congratulate itself on the progress thus far made. It has felt its strength and, finding that there is a place for it in the

world, it may be expected to settle down to business and to tackle problems it has heretofore ignored. But reforms and great bodies move slowly, and patience is a virtue that is sure to be rewarded.

The Cowles Electric Furnace, and the Production of Aluminum and its Alloys.

[An Address delivered before the Society of Arts of Boston, February 11th, 1886, by ALFRED H. COWLES.]

Ladies and Gentlemen:

Agreeably to the kind invitation extended to me by your honored Society, I will this evening describe in full our electric furnace and recently discovered process for the cheaper production of that wonderful metal, aluminum, as well as other rare metals and new alloys.

A quarter of a century ago Professor Faraday, in a lecture on platinum, described what was probably the first electric furnace ever designed. This furnace was one in which Deville, who, under the auspices of Napoleon III., made such great advances in the production of aluminum, proposed to purify platinum. He accomplished this by heating the platinum to such a temperature that the baser metals were volatilized, leaving the platinum pure. I will quote the following paragraph from this lecture:

"I have here an apparatus by which this thing can be shown. Here is a piece of platinum, which is put into a crucible of carbon, made at the end of one pole of a battery, and you will see the brilliant light that will be produced. There is our furnace, and the platinum is rapidly getting heated; and now you perceive that it is melted, and throwing off little particles." And now that scientist, evidently looking into the future, exclaimed—"What a magnificent philosophical instrument this is!"

Since then nothing more was accomplished in the application of electricity to heating furnaces till 1880. In June of that year Sir William Siemens described before the Society of Telegraph Engineers a furnace designed to melt considerable quantities of such excessively refractory metals as platinum, iridium and steel. It differed from the furnace used by Deville, in having a carbon rod for one electrode, and the metal contained in a graphite crucible as the other electrode. The crucible was surrounded on the *outside* by fine charcoal. Inside, an arc was formed, which was adjusted by proper mechanism. He explained that he was led to undertake experiments of this nature by the consideration that a good steam engine converts 15 per cent. of the energy residing in coal into mechanical effect; while a good dynamo electric machine is capable of converting eighty per cent. of that mechanical energy into electrical energy. If the latter could be expended without loss within an electric furnace, it would doubtless far exceed in economy that of the air furnaces still largely used in Sheffield. Other important work, and his death two years later, probably prevented the further development of this furnace.

A year later Faure took out patents for an electric furnace designed for the reduction of sodium and potassium. At this time the science of chemistry had quite reached the point where it was ready to say that the oxides of such metals as aluminum, calcium, magnesium and metalloids, as boron and silicon, were not susceptible of reduction with carbon as the reducing agent. It may be from this cause that he did not cover a broader field, or from some imperfection in his furnace, that he did not put into execution the splendid idea of manufacturing by a cheaper process sodium and potassium.

I will now continue with a description of the furnace whose model we have here. It is simple in construction, being what might be called a rectangular box, one foot wide, five feet long, inside measurement, and fifteen inches deep, and made of fire brick. From the opposite ends, through pipes (only one being shown here), the two electrodes and holders pass. The electrodes are immense electric

light carbons, three inches in diameter and thirty inches long. The ends are placed within a few inches of each other, in the center of the furnace. The pipes, you will notice, contain packing boxes, which prevent the air from entering into the interior. The furnace now operated at the main works of the Brush Electric Company, in Cleveland, is connected with the largest dynamo ever made by that company. It produces about 70,000 watts of current, or about ninety electrical horse-power, as its average work. In this circuit between the furnace and dynamo is placed the resistance box and an ammeter. The resistance box is so constructed that a variable resistance may be thrown into the circuit, if such be desired in controlling the current. The ammeter was designed by Mr. Brush, and is so constructed as to take from fifty to two thousand amperes of current around its helices and register the same upon its dial.

These connections having been made, the furnace is now ready to receive the charge. The walls of the furnace must first be protected, otherwise the intense heat generated within the interior would cause the fire-brick to melt and flow like water. What is the best substance to line the walls with? Finely powdered charcoal is comparatively a poor conductor of electricity. It is considered infusible, and is the best non-conductor of heat of all known solids. From these properties it would seem to be the best material to use as a lining for the furnace. So long as the air is excluded it is impossible for it to burn. But we find after using pure charcoal for a few times that it becomes valueless. It retains its woody structure, as is shown in the larger pieces, but it has changed to graphite, becoming a good conductor of electricity, and thereby it tends to diffuse our current through the lining, heating it and the walls. We therefore wash the fine charcoal in a solution of lime water. After drying, each particle is insulated by a fine coating of lime. The bottom of the furnace is now lined to a depth of two or three inches with this prepared charcoal. A sheet-iron gauge is placed along the sides of the electrodes, leaving about two inches between it and the side walls. In this space more fine charcoal is placed. The charge, consisting of about twenty-five pounds of the oxide of aluminum, in its native form as the mineral corundum, twelve pounds of charcoal and carbon, and fifty pounds of granulated copper, is now placed within the gauge, and spread around the electrode to within a foot of each end of the furnace.

After this is done a bed of charcoal, the granules of which vary in size, from that of a chestnut to that of a hickory nut, is spread over the charge and the gauge withdrawn. This coarse bed of charcoal above the charge allows free escape for the carbonic oxide gas generated during the reduction. The charge being in place, an iron top, lined with fire brick, is placed over the whole furnace, and the crevice luted to prevent the entrance of air. The brick of the walls insulate this cover from the current.

Now that the furnace is charged and the cover luted down, we are ready to start, and observe what takes place. The ends of the electrodes were in the beginning placed close together, and from this cause the internal resistance of the furnace may be too low for the dynamo, and cause a short circuit. We therefore throw sufficient resistance within the circuit, by means of the resistance box, to make it safe to start the dynamo. This being done, an attendant gradually takes the resistance of the box out of the circuit, and by watching the ammeter, and now and then moving one of the electrodes out a trifle, he is enabled to prevent undue short-circuiting in the beginning of the operation. In about ten minutes the copper between the electrodes has become melted, and the latter are moved far enough apart so that the current becomes steady. The current is now allowed to increase, till we are drawing from the dynamo about thirteen hundred amperes, driven by fifty volts. Carbonic oxide gas has already commenced escaping through the two orifices in the top, and there it burns to carbonic acid gas, forming two white plumes of flame. By slight movements outward of the electrodes during the coming five hours, the internal resistance of the furnace is kept constant, and at the same time all the different parts of the charge are

brought in turn into the zone of reduction. At the close of the run we shut the furnace down by placing a resistance in the box, and then switching the current into another furnace, which has been charged in a like manner.

During five hours there has been, we might say, pumped into the furnace ninety electrical horse-power. By Joules' equivalent, when this power is changed to heat it equals one million one hundred and fifty-four thousand Fahrenheit heat units, or sufficient heat, if it were devoted to heating the fifty pounds of copper alone contained within the furnace, to raise it to a temperature of two hundred and forty-two thousand degrees, were such a thing possible. During the beginning of the operation the copper first melted in the center of the furnace. There was no escape for the heat that was continually generated. The temperature increased till the refractory corundum melted, and, being surrounded on all sides by carbon, gave up its oxygen, and thereby complies with Berthollet's law. The heat of the union of the oxygen liberated from the aluminum uniting with the sesquioxide carbon, has certainly aided in the economy of the process. The copper has had nothing to do with the reaction, as it will take place in its absence.

Whether the reduction is due to the intense heat, to electrolytic action, or both, is difficult to say. If it be electrolysis, it is my impression that we have here a case where electrolysis can be accomplished with an alternating current, although it has not been tried as yet. Were the copper absent the freed aluminum would now absorb carbon, and become a yellow crystalline carburette of aluminum; but, instead of that, the copper has become a boiling, seething mass, and the bubbling of its vapors may be distinctly heard. The vapors probably rise an inch or two, condense, and fall back, carrying with them the freed aluminum. This continues until the current is taken off from the furnace, when we have the copper charged with from fifteen to thirty per cent. of its weight of aluminum. After cooling the furnace this rich alloy of aluminum and copper is removed.

Here we note again another valuable property of the fine charcoal. The capillary action between it and molten metal is such that the metal does not spread and run through its interstices, but remains a liquid mass surrounded below and on the sides by fine charcoal. The alloy presents a white appearance and the brittle nature of the sample I have in my hand. This metal is now melted in an ordinary crucible furnace, poured into large ingots, and the amount of aluminum it contains is determined by analysis, after which it is again melted, and the requisite copper added to make the valuable aluminum bronzes, of which we will speak later.

Two runs as described will produce, in ten hours' average work, about one hundred pounds of this white metal, containing about fifteen pounds of aluminum. From this data it has been carefully estimated that aluminum itself, in its alloys, can be produced at about forty cents a pound in the works now being erected by the Cowles Electric Smelting and Aluminum Company at Lockport, New York, and the production of it pure, although the problem lacks some links in its economic solution, will surely not double that cost. This estimate is based upon the present size and form of furnace. As to its future possibilities it is difficult for one to form definite opinions. To my mind it is now as crude as the ancient Spanish adobe furnace for the production of lead and silver, or the old Catalan forge which was used in the early production of iron. With electricity we have at hand a beautiful means of future automatic regulation of the electrodes, of the feeding of the charge, of the working of the dynamo, and of the driving of machinery, so that all parts may be made to work in perfect harmony. Within the coming year the Cowles Electric Smelting and Aluminum Company will have facilities to concentrate within one furnace the energy of twelve hundred horse-power, or nearly that of the great Corliss engine, which furnished the power for machinery hall at the Centennial ten years ago. With a larger furnace there is no reason why

it should not be made to run continuously, like the ordinary blast furnace.

The temperature attainable within the furnace is only limited by the fusion point of carbon; as yet we have not reached this limit. The charcoal is easily changed to graphite, but so far it has always retained its woody structure. A run, carefully made with this fusion in view, would be intensely interesting, as it would probably solve the question as to whether the diamond is a product of fusion, or a product of crystallization from a solution. The fusion of the corundum frequently gives us minute crystals of the ruby and sapphire.

Pure white sand is not only made to melt, but is easily reduced to silicon. Here we have a mass of minute crystals of silicon, that came from a fire-brick being placed within the furnace and too near the center of heat. The other elements that were present seem to have volatilized, leaving nothing but the silicon behind.

Boron, sodium, potassium, calcium, magnesium, chromium and titanium, have all been reduced in the furnace. It is safe to say that no metallic oxide can resist the intense reducing forces that are here brought to bear upon it. To go further into the great chemical possibilities of electric smelting would take too much time.

In the operation of the furnace copper was used to gather the aluminum together, and prevent its formation into carburette of aluminum, or into the amorphous powder. The copper acts somewhat as a condenser to the metallic fumes of aluminum liberated. In place of the copper, any non-volatile metal may be used as a condenser, to unite with any metal we may desire to reduce; provided, of course, the two metals are of such a nature that they will alloy with each other at this high temperature. In this way aluminum may be produced and obtained, alloyed with iron, nickel, silver, tin or cobalt. We have made alloys containing 50 per cent. of aluminum and 50 per cent. of iron; 25 per cent. of aluminum and 75 per cent. of nickel; 30 per cent. of aluminum and 70 per cent. of copper. I have here some of these alloys. Silicon or boron, or other rare metals, may be combined in the same manner, or tertiary alloys may be produced, as, for instance, when fire-clay is reduced in the presence of copper we obtain an alloy of silicon, aluminum and copper. This is a white, brittle alloy, when more than ten per cent. of aluminum and silicon is present in the copper. With from two to six per cent. of aluminum and silicon, in equal proportions, the alloy is stronger than gun metal, has great toughness, does not oxidize when heated in the air, and has fine variations of yellow gold color.

It is difficult to say which of this great number of possible combinations of metals will form valuable alloys and find their way into the arts. It is very possible that some of them may prove as much finer than aluminum bronze as that bronze is finer than gun metal. Who can tell? History may repeat itself, and the world may return to a bronze age. In the case of these rare metals, which are, in fact, the common metals of the earth's crust, what part will they play in the future history of mankind? It is a fact that there is no element which has been procured cheaply in the past but that has become an important factor in the work of civilization.

In aluminum and some of its alloys, and in silicon alloyed with copper and tin, and known as silicon bronze, we have metals that heretofore have been procured by old and expensive processes, and whose remarkable physical properties have been quite thoroughly studied.

Here is a small ingot of aluminum which was produced from its oxide, with carbon as the reducing agent in the electric furnace. It is not quite pure, its specific gravity being two and eight-tenths. When pure, a casting should have a specific gravity of two and five-tenths. It is as strong as iron or copper, if equal cross-sections be compared, or as strong as steel if equal weights be taken in comparison. Under the hammer it works like the best Norway iron. In color it approaches silver, and has been called the silver made from clay. Neither the oxygen of the air or sulphurous acid gas will

attack it at ordinary temperatures. We have found that ten per cent. of copper added to it renders it hard and rigid, not materially changing its color or luster, and in the testing machine it showed a strength greater than cast iron by one-half. Pure, it can be rolled into sheets or drawn into the finest wire. Its electrical conductivity is sixty-four, copper being one hundred. Taking its specific gravity into consideration, we find it is two and one-fifth times as efficient as copper, and about twenty times as efficient as iron as an electrical conductor. In other words, aluminum wire at one dollar and twenty cents a pound would be as cheap as iron wire at six cents for electrical purposes, and have the advantage of using but one-twentieth the weight. In alloying with other metals it seems to impart in almost every case new and valuable properties to the resultant alloy. Here is a sample of the finest grade of aluminum bronze. It contains about eight and one-half per cent. of aluminum and one per cent. of silicon. Tests have shown that the silicon increases its strength, and does not interfere with its fine color or luster. Cast samples have shown as high as one hundred and seventeen thousand pounds tensile strength to the square inch. In making this bronze, the white metal, rich in aluminum, is first melted, and then the requisite copper added to it till a sample can be taken from the crucible which shall show a test of ninety thousand pounds or over. Unlike ordinary brass or bronze, it will stand remelting or long-continued heat without marked deterioration. This was proved by melting one hundred pounds in a crucible. After it was melted a test was made, which showed ninety-five thousand pounds tensile strength, and six per cent. elongation. The metal was now kept at intense heat for four and one-half hours. At the end of that time it was again tested, and showed eighty-three thousand pounds tensile strength and eleven per cent. elongation. No appreciable loss could be detected in the weight. In hardness it does not quite equal tempered tool steel, yet it is so hard that a polished surface is not easily scratched. As an anti-frictional metal it is said to be unsurpassed. Its fine color and permanent luster have enabled it to find a ready use at its past high price, for ornamental articles, and its great strength has led to its use in many places where strength and beauty were desired. It has been highly recommended for heavy artillery. Its high price in the past seems to have been the only cause that has precluded its use in guns, propeller wheels, and a thousand and one places where great strength is desired without the work of forging steel. At a red heat aluminum bronze is malleable, and, unlike copper or ordinary bronzes, it may be heated, and as many as a dozen sheets of metal may be rolled in a pack at the same time, thus enabling it to be rolled very cheaply.

If the percentage of aluminum in the alloy be reduced to seven and one-fourth, and of silicon to three-fourths, we obtain a metal with a tensile strength ranging from sixty-six thousand to seventy-seven thousand pounds to the square inch, and from twenty-five to forty-four per cent. elongation of its original length. In other words, it has more than three times the strength of copper, and surpasses it in ductility.

The five per cent. aluminum bronze has a fine yellow gold color, does not oxidize, is about as strong as gun metal, but more ductile.

Two and one-half per cent. of aluminum in copper gives it a fine red gold color, and prevents oxidizing in the air, even at a red heat.

Some of the bronzes are greatly increased in strength, permanency of luster and ductility, by the addition of from one to three per cent. of aluminum. This is well illustrated by the following tests, made from test bars that were cast attached to a hundred pound casting. The composition of the metal before melting was two parts in weight of five per cent. aluminum bronze and one part of zinc. One of the bars registered 91,196 pounds tensile strength and 4.6 per cent. elongation, and the other 94,416 pounds and seven per cent. elongation. This surpasses Prof. Thurston's maximum tin, copper, and zinc alloy by 20,000 pounds in tensile strength, and by a considerable percentage in elongation. Yet there is a large field for investigation in the possible alloys of zinc, copper and aluminum.

I have here some brass screws that have been pronounced by Mr. Bidwell, superintendent of the Union Screw Company, of Cleveland, to be equal in strength to the best steel screws.

Knife blades, cast in sand, from German silver containing three per cent. of aluminum, have been made and finished. The aluminum changes the German silver to a color lighter than steel, but not so white as silver, and renders it non-tarnishable, hard, elastic, and strong enough to whittle hickory.

Thanking you, ladies and gentlemen, for your kind attention, I will now be pleased to show the few samples here to such as may desire to look at them.

The Jewelers' Security Alliance.

President, DAVID C. DODD, JR.

First Vice-President, AUGUSTUS K. SLOAN.....Of Carter, Sloan & Co.

Second Vice-President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.

Third Vice-President, DAVID UNTERMAYER.....Of Keller & Untermeyer.

Treasurer, W. C. KIMBALL.....Of H. F. Barrows & Co.

Secretary, C. C. CHAMPENOIS.....Of Champenois & Co.

EXECUTIVE COMMITTEE.

C. G. ALFORD, *Chairman*.....Of C. G. Alford & Co.

J. B. BOWDEN.....Of J. B. Bowden & Co.

GEO. W. PARKS.....With E. I. Franklin & Co.

J. T. SCOTT.....Of J. T. Scott & Co.

N. H. WHITE.....Of N. H. White.

CHAS. G. LEWIS.....Of Randel, Baremore & Billings.

EXAMINING FINANCE COMMITTEE.

JOS. STERN.....Of Stern & Stern.

CHAS. F. WOOD.....Of Chas. F. Wood.

Counsel, HON. ALGERNON S. SULLIVAN.

For further information, Application Blanks for Membership, By-Laws, etc., Address
P. O. Box 3277. 170 Broadway, New York.

The regular monthly meeting of the Executive Committee was held on the 12th inst., attended by Vice-Presidents Sloan, Hayes and Untermeyer, Messrs. Alford, Bowden, White and Secretary Champenois.

The following firms were admitted to membership:

T. R. J. Ayres & Sons, Keokuk, Iowa; A. Bloedel, Milwaukee, Wis.; F. W. Baier, St. Louis, Mo.; Block & Bergfels, Newark, N. J.; D. J. Betz, Frostburg, Md.; T. C. Parker, Wilkesbarre, Pa.; T. G. See, Yonkers, N. Y.; H. M. White, Castile, N. Y.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

It cannot be denied that a decidedly dull wave has swept over Western business during the last two or three weeks. This has been experienced by nearly every staple line of business, so the jeweler need have no particular cause for anxiety or apprehension. It appears to be simply one of those fluctuations which are liable to set in without any very apparent cause. The severe state of the weather and the blockaded condition of the roads throughout the West during the last month have doubtless contributed to the slight depression that has been pretty generally felt. The united testimony of the jobbers of Chicago is that trade has been quiet—more so than they would have anticipated from the favorable indications early in the year. Orders have been considerably lighter than during the first weeks of January, and collections have shown a somewhat slower tendency. The city trade, however, has been fairly lively—at least business has kept moving. Mr. Stein, of Stein & Ellbogen, who has just returned from a trip to the lumber region and west of the Mississippi, gives rather a discouraging estimate of the condition and prospects of the trade at the points which he visited. He states that retailers are feeling very blue and little inclined to do much business.

This he attributes considerably to the very low wages which lumbermen are paying their men in the woods. \$16 to \$18 a month does not allow a workman much margin to venture on luxuries. B. F. Norris, Alister & Co., on the other hand, report that their travelers are doing an excellent business in Michigan, and that the success which they have been meeting with in northern Minnesota is largely beyond expectation. Their order trade also has been good and collections easy. Some jobbers think, from present indications, that retailers will be more careful in buying this year than last, but it only needs a little encouragement such as came during the holidays to set business moving again as briskly as ever. The opening up of the country through the melting of the snow and the present favorable indications of an early spring, can hardly fail to have a stimulating effect on trade. It is not expected, however, that very much will be done in the spring trade proper till after Lent. Meanwhile, jobbers are getting in their new goods ready for whatever trade may come.

The most important item in trade circles announced during the month is the retirement from the jewelry trade of the well known and successful jobber, Otto Young. Mr. Young, in retiring from the business in which he has been so prominent, has not done so to seek a life of ease, but becomes a partner with a half interest in the celebrated general store known as "The Fair." Mr. E. J. Lehman, its former sole proprietor, found the weight of managing such an extensive and continually increasing concern too much for one head, and wisely selected for a partner his old friend, Otto Young, who had shown such conspicuous business capacity in the jewelry line. Mr. Young is to be congratulated on his good fortune in securing an interest in such a paying concern. The firm which Mr. Young quits becomes a joint stock company, with the name of Otto Young & Co., and Mr. Julius Schnering, who has been for a considerable number of years in Mr. Young's employ, and latterly a partner in the firm, will be the manager of the company. The Blauer Watch Case Manufacturing Co., in which Mr. Otto Young has owned the controlling interest for several years, will in future be run as a joint stock company, with Mr. James Fleming, formerly with H. Muhr's Sons, of Philadelphia, as manager. Mr. Young has resigned the treasurership of the National Association of Watchmakers and Jewelers, to which he was recently elected, and the vacancy has been filled by the appointment of Mr. C. H. Rowe.

Samuel Swartchild has got his new catalogue out, and for completeness, compactness and general excellence, it is equal to almost anything yet presented to the trade. To meet the urgent requirements of his steadily increasing business, he has greatly extended his premises by taking in a large room immediately behind his original store at No. 71 Washington street. Wendell & Co. have removed their manufacturing business from Madison street to No. 150 State street, where, with much larger premises, they will employ a considerably larger staff of workmen.

Benjamin Allen has not been in the most robust health for some time. After his return from the East he proposes to spend some time in the Southwest, and it is to be hoped that the rest and change of scene will send him back to business thoroughly reinvigorated. B. F. Norris, who has been spending the winter in California, is feeling much stronger, and expects to return to Chicago about June 1. Charles A. Allen, the large silver plater, who met with a serious accident towards the end of January, by being thrown out of a wagon, has nearly recovered from his injuries, and is now able to attend to business.

J. P. Owen, the genial and popular manager here for Messrs. Robbins & Appleton, has, to the regret of his many friends, been transferred by the company to another sphere. His headquarters will now be at Cincinnati, O., though he will devote part of his time to all the leading cities from Cleveland to Kansas City. C. H. Taisey, of Boston, who has been with Robbins & Appleton for about ten years, has succeeded Mr. Owen as manager at Chicago.

The action of the Waltham Watch Co. in giving rebates to retailers in consideration of the recent reductions in the price of movements,

meets with great satisfaction and much favorable comment in the West.

The arrest of Joseph S. Gratz, the absconding jobber, at San Antonio, Tex., toward the end of January, gave lively satisfaction to the trade in Chicago, no less than the anxious creditors at New York and other eastern points. Mr. Gratz within two hours of his arrival was charged before a justice with fraudulent conveyance of his property, and with conspiracy with parties unknown to defraud his creditors. The case was continued for the production of witnesses from New York, and after several delays Mr. Gratz was eventually held to the Grand Jury under bonds of \$2,500. Being unable to find the requisite amount of bail, Mr. Gratz went to the county jail, where he still remains.

Great interest has been felt among the local jobbers in the session of the National Association which has been in progress in New York during the month, and there is a general hope that the important matters under discussion will be settled in a manner suitable to the views of both eastern and western traders. Jobbers here are considerably divided as to the desirability of stated prices being fixed for cases, etc., in the way indicated by a recent circular received. Some seem to be in favor of having something like a 25 per cent. margin on which they can come and go as occasion may require, while many others are just as determined as most New Yorkers in their desire for absolutely fixed prices.

The National Association of Watchmakers and Jewelers, which promises to go a very long way toward cementing the various branches of the trade together in a healthy and beneficial reciprocity, is meeting with gratifying success. It is earnestly to be hoped that the retailers, for whose benefit it has been specially designed, will show true reciprocity by trading with their local jobbers, in whatever part of the country they may be located, instead of giving the local trade the go-by and dealing with distant cities. A little further consistency in this direction will do much to build up and strengthen this promising association, and remove some of the prejudices that still exist with regard to it in the minds of certain jobbers.

Our obituary chronicles the death of Charles E. Benson, the well known and widely respected western manager of the Dennison Manufacturing Co. Mr. Benson died at his home here Jan. 28, 1886, of paralysis of the brain after a brief illness. The deceased was born in Central Massachusetts, and, losing his parents in early infancy, was brought up on the farm of his guardian until he was twelve years old. At that early age he became dissatisfied with the monotony of farm life, and, shipping as a cabin-boy on a New York packet, he made two voyages around the world. He returned to America at the outbreak of the war, and, entering the navy, served at the blockades of Charleston and Savannah. Receiving his discharge from the navy, he enlisted in a Massachusetts regiment at Worcester, and, after seeing a good deal of active service, was captured by the rebels and imprisoned successively at Libby, Andersonville and Florence until the close of the war. It is believed that the physical and mental hardships and strain to which he was subjected during this imprisonment, laid the foundation of the disease to which he finally succumbed. After the war he returned to Worcester, and soon obtained a situation in the Harris Woolen Mill at Blackstone. Some time afterwards he entered the service of the Dennison Manufacturing Co. as a canvasser and solicitor. He soon showed himself to be possessed of rare business abilities, and was rewarded by promotion at every opportunity. He at length rose to be western manager of the company, which position he held till the time of his death. Mr. Benson was a thoroughly upright, conscientious man of business, full of energy and perseverance. He was held in the highest esteem by a large circle of friends for his unimpeachable personal virtues and excellent business qualities, and his death is deeply deplored by all with whom he ever came in contact. He leaves a wife and one child. His remains were taken to Woonsocket, R. I., for interment. W. A. B.

The National Association of Jobbers in American Watches.



THE ANNUAL MEETING of the above named Association was held February 9, 10 and 11, in the rooms of the Jewelers' Board of Trade, New York city. Representatives of the following named firms were present:

New York.—Wheeler, Parsons & Hayes, Aikin, Lambert & Co., Cross & Beguelin, Henry Ginnel & Co., Keller & Untermeyer, Marx & Weis, Lissauer & Sondheim, S. F. Meyers & Co., Stern & Stern, D. Kahn, Oppenheimer Bros. & Veith, S. Levison, Fellows & Co., Aug. Schwerter, H. Rypinski, G. W. Dubois & Co., C. L. Abry, E. A. Haldiman, A. Schwob, R. & L. Friedlander, C. G. Alford & Co., N. H. White, Henry Carter, J. Gallet & Co., F. Bayerdoerfer, Jacob Strauss, Trier Bros., J. T. Scott & Co., G. W. Pratt & Co., Max Freund & Co., J. Rosenzweig, Smith & Knapp, J. Bunzel, Edwin A. Thrall, L. Herzog & Co., Chas. Gagnebin, Stern Bros. & Co., H. E. Droz, C. K. Colby, Pforzheimer, Keller & Co.

Chicago.—Clapp & Davies, Otto Young & Co., Lapp & Flershem, Blauer Watch Case Co., C. H. Knights & Co., Benj. Allen & Co., H. F. Hahn & Co.

Philadelphia.—Simons, Bro. & Co., T. B. Hagstoz & Co., Booz & Co., Alfred Humbert, Pfaelzer Bros. & Co., H. Muhr's Sons, L. A. Scherr & Co., C. N. Thorpe & Co

Pittsburgh.—Goddard, Hill & Co., Heeren Bros. & Co., G. B. Barrett & Co.

Boston.—D. C. Percival & Co., Whitney Bros., Morrill Bros. & Co.

A. Lesser & Son, Syracuse, N. Y.; Ansteth & Reinsch, Buffalo, N. Y.; Bowman & Musser, Lancaster, Pa.; Clemens Hellebush, Cincinnati, Ohio; M. Wunsch & Co., San Francisco, Cal.; Koch & Dreyfus, New Orleans, La.; Hennegen, Bates & Co., Baltimore, Md.

Eighty-five other members sent proxies vested in sixteen of those present, so that the sentiment of the whole membership was represented in the meeting, which was entirely harmonious and practically unanimous in all its actions.

The following named gentlemen were present by invitation:

T. M. Avery, Pres't Elgin Nat. Watch Co.; S. H. Hale, of Amer. Walt. Watch Co.; C. D. Rood, of Hampden Watch Co.; Jacob Bunn, Pres't Illinois Watch Co.; Jos. Fahys, Pres't Fahys Watch Case Co.; W. A. Moore, of Dueber Watch Case Co.; C. N. Thorpe, of Keystone Watch Case Co.; Otto Young, of Blauer Watch Case Co.; Chas. Duhme, of Duhme & Co.; Geo. Chillas, Sec'y Canadian Jobbers' Association; W. C. McNaught, of Amer. Watch Case Co., of Toronto.

After a short address of welcome by the President the meeting proceeded to business, and the reports of the Secretary and Treasurer were read, showing 262 members, and a good balance in the treasury.

The Association then voted to allow the manufacturers of gold filled and base metal cases to co-operate with it, and these goods will in future be sold under a contract, the same as movements and silver cases.

As usual at such meetings, most of the business transacted was routine, and concerned only the members, but the following action which was taken is of general interest to the trade:

The manufacturers were requested to cease taking orders through their travelers, and confine them to recommending their goods, leaving the retail dealer to order them from any jobber he chooses.

The movement manufacturers were requested to make a uniform charge for lettering special names on dials.

Jobbers who keep a retail store also, must do at least one-half their business in American watches at wholesale and to the trade, or be dropped from the list.

All national trade price lists must be sent out in sealed envelopes.

Reasserting the decision that it is a violation of contract to adver-

tise the prepayment of express charges on packages, or to make a practice of it to influence trade.

The following named gentlemen were unanimously re-elected officers of the Association for the ensuing year :

President, Henry Hayes, New York ; Vice-President, H. F. Hahn, Chicago ; Secretary and Treasurer, J. H. Noyes, New-York.

The unanimous sentiment of the meeting was, that the regular jewelers are the dealers who should handle American watches, and they should be protected by every practicable means.

A vote of thanks was tendered to the officers and the executive committee for their work, and to the New York members for their attentions, and the meeting adjourned.

The efforts put forth by the Association during the year just passed was largely experimental, but with the experience of the past and the more perfect organization effected at this meeting, it is confidently expected that the Association will prove a still greater benefit to all concerned.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

RETAIL DEALERS AND OUTSIDERS.

To the Editor of the Jewelers' Circular:

While I would like to see the jewelry trade conducted through the legitimate channels, as a manufacturer I contend that the retail dealers are responsible for the fact that many manufacturers and jobbers have encouraged outside competition. As a rule, retail dealers are not good business men ; they buy their goods on long credit and put their creditors to so much trouble that the latter charge them accordingly. Then they expect too much profit on their goods, and grumble if the public will not pay them more than they can get the same goods for in other places. Outsiders who handle jewelry sell at lower prices than the retail jewelers do, yet they make a profit on all they sell. Why? Simply because they buy for cash, get bottom prices and sell for a small profit. There is no reason why the retail dealer should not control the jewelry trade if they would do business on business principles, and especially adopt the motto "quick sales (for cash) and small profits." Does the retailer recognize the legitimate channels of trade in buying what he requires? Will he pay the regular shoe dealer a dollar more for a pair of shoes than he will pay for a similar article offered by a dry goods man? Not much. He will buy where he can get goods the cheapest, and that is precisely what the public will do when it wants jewelry or anything else.

The retail dealers are constantly clamoring for protection from the manufacturers and jobbers, yet how effectually they ignore the rights of those gentlemen whenever it is to their interest to do so. For instance, I make a line of fine goods ; a number of my articles are patented. They have been imitated in cheap metal by envious rivals who offer their imitation goods at a less price than I can mine. Do the retail dealers, knowing all the facts in the case, recognize my rights? Not at all ; they buy the cheap goods whenever they can make a dollar, and thus bolster up the patent pirates who are trading on my capital. I have to thank the retail dealers for the loss of many a dollar, and for the fact that I am subjected to an underhand competition that amounts to robbery. If they have rights they think should be respected, so have the manufacturers. When I found that certain cheap imitations of my goods were being generally bought by retail dealers in preference to my fine goods, as a measure of self-protection I had to reduce the quality of mine to compete with those who had stolen my designs. Then I deliberately

made up a stock for the outside trade, and took special pains to put them into the hands of persons who would compete with the retail dealers. My travelers are out now and they have instructions to sell these goods to whoever wants to buy them. It is a poor rule that won't work both ways. When the retail dealers protect me I'll protect them, but just at present I am just in the humor to slaughter them at every opportunity.

RETALIATION.

Providence, February 12.

POISING THE BALANCE.

To the Editor of the Jewelers' Circular:

In poising the balance of a duplex watch, should it be done with the impulse roller on or off the staff? I notice balance is out of poise after putting it on; ought it to be? J. H. S.'s method of repairing joint on soft soldered locket is good; in repairing bracelets, however, where the joints are on plugs in the end, I remove plug, clean off soft solder, hard solder joint on and replace; when completed the bracelet is, of course, as good as when made. L.

[On.—ED.]

WEIGHTS AND PENDULUMS.

To the Editor of the Jewelers' Circular:

I recollect having seen somewhere in THE CIRCULAR remarks about the centers of the weight hung by a single cord near to a large pendulum, being made to swing by the vibrations of the pendulum. If the effects on the pendulum so situated have not been described, will some one who has studied the subject kindly tell us what they are and to what amount they cause the clock to vary from correct time. I have usually wound my regulator twice a week to avoid the trouble. I think the clock is made to run faster when the weight swings faster than the pendulum—or when it tends to do so—and slower when the weight falls below that point, but I have no accurate time by which I can test it.

W. B. S.

Sandy Hook, Conn., January 21, 1886.

SELLING GOODS TO OUTSIDERS.

To the Editor of the Jewelers' Circular:

I was much pleased to see so many communications in February number. Such letters are always interesting to me, and THE CIRCULAR would be much improved if there were more of them. A retail dealer can write things more interesting for his brother tradesmen than one who is not so situated.

"Ancient Dealer" writes a very sensible letter. It is almost enough to discourage a man to try to be honest. A dealer some time ago told me the people delighted to be humbugged, and there was not much use of dealing unless you took advantage of it. Taking everything into consideration I had rather be honest and have a clear conscience.

"New Blood" has jumped into a hole, and he may want to pull it in after him if all the retailers write what they think. Mr. "N. B." (wonder why he don't want to publish his name) says "the outsider is better pay than the ordinary retail jeweler." Man alive, why should he *not* be when Mr. "N. B." makes the jeweler pay more for the goods than Macy's man and many others, who mark their goods way down and causes the jeweler to keep his stock bought of "N. B." when he is perhaps making no more than the outsider. The goods will not sell, so how can he pay for them? Common sense will show folks many reasons why some things are. Mr. "N. B." owns up that he will sell cheaper to outside parties, and then he says if retail dealers can't hoe their row with outsiders it is because they lack enterprise. If "N. B." was obliged to pay more for his brass to make his goods of than other manufacturers, if then he could not compete with them and some one should tell him he lacked enterprise, he would look like a sick monkey on a box crying for cheese. I have never before written a word in complaint about this outside

business, as I think myself that the jeweler is apt, in some circumstances, to open inducements for the outside business. There are, of course, two sides to the story and more or less fault on both. But no one knows what a retailer has to go through unless he has been one, and for some to growl at them is not quite fair. Still, I shall try to keep my end up, and can tell some experience in another communication if necessary.

I was glad to see our editor take a stand for our side. I used to think THE CIRCULAR took up the part of the jobber and manufacturer every time, but I am glad to see this step in the right.

AMBITION.

[We shall be glad to hear from this correspondent frequently. The practical experience of practical men is worth more than all the theory in the world. What we all want to know is "what is," and from that knowledge may be able to deduce "what ought to be." —ED.]

SENDING CATALOGUES TO OUTSIDERS.

To the Editor of the Jewelers' Circular:

A Chicago firm, whose name I enclose, has a large catalogue (illustrated) which they have sent to every cross roads dealer. We are legitimate dealers and have, or had, many customers among country merchants until these unprincipled wholesale firms sent their catalogues to every grocer in the land. They furnished a customer of ours a pair of 14-k. riding bow spectacles for \$5. Cost us \$4.50 and \$5. This is only one case. We are glad to see you condemn this illegitimate business. We merely write to give you the name of one firm whom we know does it. We enclose envelope and order sheet sent us by a country dealer who keeps sugar, boots, stoves, calico, feed, hardware, leather and jewelry, etc. Our country trade is ruined. We formerly did from \$1,000 to \$2,000 every year outside, now do comparatively none. Trusting this information will be of some use to you in prosecuting your attack upon these unscrupulous dealers, we remain,
Yours truly,
Cumberland, Md., January 28, 1886. COUNTRY DEALER.

"NEW BLOOD" ANSWERED.

To the Editor of the Jewelers' Circular:

I would like to ask that smarty that is selling goods to outsiders who first built up the trade, the man that is working hard at the bench or the outsider that he is selling to? After the true watchmaker has been for hundreds of years working to bring about what has been done, after men have been working their lifetime to learn a trade, they then shall be drowned by an outsider that has never been working a day at the trade. I would like to ask this wise man to come out West here and try his hand at the watch and jewelry business, where prices are sent to every person and goods sold at wholesale to the one that he is trying to sell to at retail. I am sure he would never want to buy any more goods from the one who is selling to everybody. If he would be here in a small town where he had his hands full trying to make a living at the trade he would know better. Had it not been for the watchmaker to begin with he never would have had any outsider to sell to. He had better sell at retail altogether.
H. W.

Bird Island, February 6, 1886.

To the Editor of the Jewelers' Circular:

Statements having appeared in the daily papers of Saturday, February 13, and Sunday, February, 14, regarding the arrest of Mr. C. L. Le Cato, on a charge of Mr. J. N. Provenzano, and such statements, as they appeared, very much misrepresenting the facts, and being calculated to deceive and prejudice the trade and the public. The undersigned, who are now doing business with Mr. Le Cato, desire to state that we believe and are convinced that the charges against him are utterly without reason or foundation, and we ask you as a simple matter of justice, that should you purpose taking

notice of the matter in your paper, that you publish this letter or state the contents in your own way.

Yours very truly,
New York, February 15, 1886. THOMAS G. BROWN & SONS.
S. COTTLE CO.

A FEW WORDS THAT ARE PERSONAL.

A subscriber at The Dalles, in Oregon, encloses \$2 to renew his subscription to THE CIRCULAR, and says: "I can't well get along without it. It is always full of good reading and valuable information."

Another subscriber, in Iowa, says: "Please find postal note enclosed for a renewal of my subscription to THE CIRCULAR. I am well pleased with your work, and with the manner and policy you pursue in trying to bring the retail jewelry business to the high standard it is entitled to, particularly unity."

A Georgia subscriber sends his renewal subscription, and says: "I have taken THE CIRCULAR several years, and regard it as indispensable to my business. In addition to the general information it gives me regarding matters in the trade, I find it a text book of technical knowledge. I have cut out all the articles on watch repairing, and made a scrap-book of them, arranging the articles alphabetically and keeping a complete index. In this way I have made a book that is invaluable."

On Remarkable Copper Minerals from Arizona.

BY GEORGE F. KUNZ.



SOME of the recent output at the Arizona copper mines equals in beauty any heretofore found in the United States, and these mines bid fair to outrival the world in the perfection of their mineral yield. Among the principal varieties are azurite, malachite, chrysocolla, native copper, and cuprite. Although the azurites are not equal to the finest from Chessy, still they do not appear to disadvantage in the comparison. The malachite is not abundant, but considered as single specimens, it is hardly inferior to that from Siberia.

MALACHITE.

This mineral, from the Copper Queen mine at Bisbee, Arizona, in beauty and thickness of vein almost equals the Russian. One mass, in particular, weighing 15 pounds, would furnish a magnificent table top of no mean dimensions. Its measurements are: Length, 20 cm.; width, 15 cm.; height 15 cm. It is covered throughout with mammillary protuberances measuring 35 mm. Among other pieces of peculiar interest, one, weighing 14 lbs., has a vein several inches in thickness, and a surface roughened with mammillary knobs, the result of radiations 2.5 cm. across. On this there is a stalactite projecting as much as 10 cm., and from 2.5 to 4 cm. in diameter. Another specimen with a mammillary surface has a dozen stalactites measuring from 10 to 20 mm. in diameter, and 5 cm. in height. We also have malachite in seams, 7.5 cm. thick, and sometimes 30 cm. square, covered on both sides with mammillary tufts of malachite, so compact as readily to admit of a polish. In addition to these, there are wonderful pockets of transparent calcite and malachite, measuring 10 to 20 cm. in width, filled with tufts of brilliant green, transparent, acicular crystals of malachite, from 5 to 10 mm. long, grouped with beautiful flat nail-head crystals of calcite, also transparent, measuring 35 mm. in width.

In some instances groups of these malachite crystals, nearly 25 mm. across, penetrate the pellucid calcite, forming one of the most beautiful of mineral combinations, a malachite counterpart to the native copper in calcite from Lake Superior.

Malachite from the Copper Queen mine forms thick crusts and seams, geodes and cavities over one foot across, and entirely made up of fine acicular velvety crystals—these often two to four mm.

long, the whole surface presenting the rich sheen of a green plush velvet. No locality has furnished finer specimens of this form.

AZURITE.

Azurite from the Clifton mines, Graham county, Arizona, and also from the Longfellow mine, occurs in beautiful groups from 1 to 12 mm. in diameter, and of a dark blue color. One form of the larger crystals is $O. 1^2. I$.

One spherical group, radiating from a center in all directions, consists of crystals 20 mm. long and 7 mm. thick, partially altered to malachite on the surface. Indeed, this mineral is here found in all stages of transition, some entire groups in large crystals being completely altered to malachite. Perhaps the finest group of azurite ever found on this continent is included here, measuring 25 cm. in height and 7.5 to 15 cm. across. It is covered on both sides with brilliant dark-blue crystals, from 5 to 12 mm. long. Very interesting perfect spheres of azurite are found here, composed of small crystals, and associated with beautiful spheres of malachite, pseudo-morph after azurite.

Azurite coated with malachite was observed, and beautiful groups of perfect spheres, 15 mm. in diameter, and of a rich Berlin blue color. Azurite from the Copper Queen mine is usually in the form of small crystals, from .5 mm. to 5 mm. across, in delicate druses, or in compact mammillary masses about 12 mm. thick, or in radiations.

CHRYSOCOLLA.

This mineral is found of a beautiful turquoise blue or greenish-blue color, and containing cavities 3 to 4 cm. across, filled with thin layers of chalcedony and druses of quartz, which together form a compact coating over it. These cavities are often 7.5 cm. across, and of remarkable beauty. The quartz and chalcedony are thick enough to be susceptible of a polish, or the gangue can be cut with it, and thus a curious and attractive gem stone can be made. The handsomest mineral of this description comes from the Old Globe mine in Gila county.

Chrysocolla, in beautiful blue patches 1 to 2 cm. across, occurs in an impure black oxide of copper, making an exceptionally rich combination. The handsomest form, however (and perhaps no finer was ever found), is the glassy-green chrysocolla from the Clifton district. It is filled with transparent green flakes, 25 mm. long, 6 mm. wide, and 3 mm. thick, and penetrated by tubular hollows like the centers of stalactites. Another form consists of dark blue or bluish-green surfaces, from 7.5 cm. to 25 cm. across, only as a thin coating. This is equal in beauty to that from any other known locality.

CUPRITE.

This species occurs in brilliant red crystals of cubic form, measuring from 1 to 5 mm., in groups of several dozen crystals, embedded in massive cuprite, and associated with native copper, from the Clifton group of mines, Graham county, Arizona. It is also found in very dark cochineal-red crystals, almost black, in fact, associated with malachite and calcite. One fine cube, coated with acicular crystals of calcite, measures 8 mm., and one fractured crystal 10 mm. One group, 3.5 cm. by 6 cm., consisting of several hundred crystals, principally elongated cubes, from 1 to 3 mm. wide, has, in addition to the elongated form, crystals of the simple octahedron, the cube, and dodecahedron, and the cubo-octahedron and dodecahedron combined. The crystals from the Copper Queen mine are from .5 to 1 mm. in size, and are simple octahedrons sharply defined, of a deep red color, implanted on malachite, coated with limonite.

These crystals are usually white, but the color is due to a film, which can be easily removed by washing.

Diopase is obtained in beautiful bluish-green crystals, 5 mm. in diameter, from the Clifton district; also native copper of a branching coralloid form, in groups of indistinct crystals, beautified by a red amorphous coating of cuprite, often 1 to 2 mm. in thickness, which is again enveloped in a thin white coating of kaolin, or, as is frequently the case, with an alteration of malachite after cuprite; in

both instances the cuprite and copper protruding through the other coating.

Aurichalcite, from Copper Queen mine, is found lining and covering cavities from two inches to seven and eight across (5 to 20 cm.) It forms beautiful tufts and radiations of a light green and bluish-green color, or is also associated with opaque white calcite crystals in limonite cavities. The crystals in the tufts are from 2 mm. to 4 mm. high, and for beauty of association rival anything yet found.

Cerussite is abundant at the Flux Mine, in Pima county, where it occurs in wonderful masses and veins of a pure snowy white color. Solid blocks are taken out a foot square, and weighing from 50 to 60 lbs., made up entirely of crystals from 1 to 4 cm. in length, although the form is not distinct, except in occasional cavities.

One interesting group, 10 cm. square, is beautifully tinted with green by a deposit of carbonate of copper. The crystals are very perfect but indistinct. In respect to quantity of material, these specimens are unsurpassed.

At the Belle Mine, Yavapai county, cerussite is also plentiful, but is not so white, and usually covered with a brown coating.

I am indebted to Messrs. Adams, Shaw and Nivens for information and specimens.

[All these mineral varieties were illustrated with a large set of very elegant specimens.]

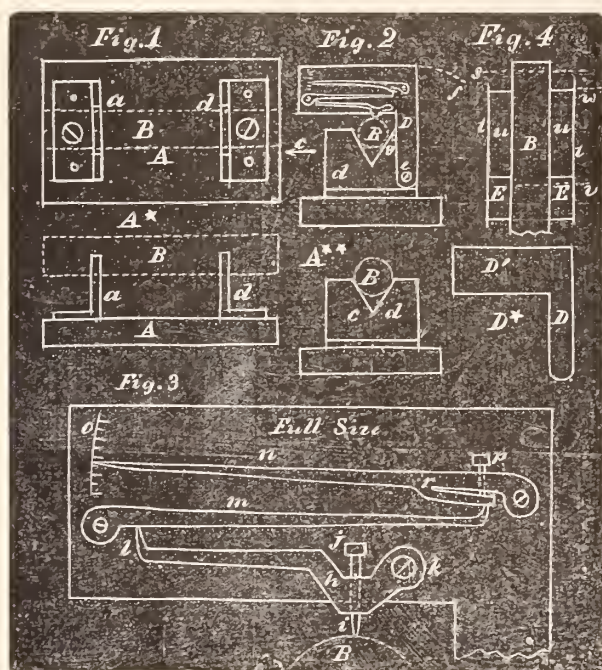
Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.



THE BAR on which the slide for carrying the movable jaw of our micrometer measuring tool will require all our skill to make true enough. I said about the same thing in my article in January number, but this is so important a feature that it will bear more than one repeat. I spoke of turning the bar as true as we could measure with ordinary callipers, and then promised to describe a machine or device for more accurate testing; such a device is shown in fig. 1. It consists of a bed of cast iron 3x5 inches and $\frac{1}{2}$ an inch thick. This bed is shown in place at fig. 1 and diagram *A****. Attached to this bed are two pieces of thick brass (No. 10) bent at right angles as shown in diagram *A**. These pieces are got out $2 \times 2\frac{1}{2}$, and bent so the part attached to the cast iron bed *A* shall be 1 inch, and the part which rises as shown at *a d*, diagram *A**, will be $1\frac{1}{2}$ inches. At diagram *A*** is shown an end view as seen in the direction of the arrow *c*, fig. 1; this shows a notch in which the bar (*B*) of the measuring instrument is laid to be tested. The bar *B* is shown in dotted outline in diagrams *A** and *A***. The notches in the pieces *a d* are $\frac{7}{8}$ of an inch wide at the top and the angle at *c* 60° . These pieces can be put back to back and filed into shape to correspond. In diagram *A**** is shown the bed piece *A*, and at the dotted squares *a d* are parts supposed to be raised a trifle above the general surface of *A*, to be filed and fitted for the brass supports *a d* to be attached to. This arrangement saves the flattening of the whole upper surface of *A*. These projections in dotted outline at *a d* need not be much above *A*, and can be glued to the pattern from which *A* is cast. A thickness of $\frac{1}{16}$ of an inch is quite enough. The brass pieces *a d* need not be very accurately fitted, but they should be firmly and securely attached to *A* with a screw and 2 steady pins. They should be 3 inches apart. The idea is, we wish two Y-shaped pieces in which we can rest the bar *B* for test measurements. The V-shaped notches in *a d* should be as near alike as can be conveniently done; but no especial care need be used, as the accuracy with which the device measures depends more on the principles involved than on the mechanical perfection of the parts. This arrangement is not calculated to measure to definite sizes, nor is it necessary that our bar *B* should be (as I said before) exactly $\frac{1.5}{100}$ of an inch; but it is important it should be true, and the device I am

now describing is eminently adapted to secure this end. The measuring appliance for testing *B* is attached to one of the *Y*'s, say *d*, and shown in fig. 2 as if seen in the direction of the arrow *c*. It consists of a series of levers arranged to magnify errors. The device consists of several parts, and we will now proceed to consider and describe these parts in detail. The first essential is an L-shaped piece of No. 12 brass, shaped as shown in diagram *D**; the perpendicular part shown at *D* is half an inch wide and $2\frac{3}{4}$ long; the part *D'* extending horizontally is 1 inch wide and $2\frac{1}{2}$ inches long. Fig. 2 and diagram *D** are $\frac{1}{4}$ actual size. The L-shaped (but when in use bottom side up is like an *F*) is attached to the piece *d* with the screw *c*, fig. 2. This screw serves as a joint on which it can be thrown back in the direction of the dotted circle *f* when not in use, and when in use it is brought forward until it strikes the stud *g* and assumes the position shown in fig. 2. At *B*, fig. 3, is shown the outline of bar for our measuring instrument as it lies in the *Y*'s. Above *B* is shown a point *i* which projects downward and rests on *B*; the point *i* is attached to a lever *h* which turns on a screw at *k*. The point *i* is a screw with a head at *i* passing through the lever *h* edgewise. The screw part of *i* need not be more than $\frac{1}{20}$ of an inch



in diameter, while the point *i* is only a smooth, blunt point. Fig 3 is made $\frac{1}{2}$ actual size to show the details more distinctly. The lever *h* terminates in a wedge-shaped point at *l*; this wedge-shaped point *l* engages another lever *m* jointed with a screw as shown. This lever *m* engages still another lever *n*. This last lever (*n*) terminates in a point at the index *o*. A noticeable feature of this last lever (*n*) is a screw at *p*. This screw (*p*) is for final adjustment to bring the point of *n* to a central part of the index *o*. It will be seen on inspection of fig. 3 at *r*, that a tongue is sawn from *n*, and against this tongue the screw *p* works. To illustrate the working of the parts we will suppose the bar *B* is laid in the *Y*'s *a d*, as shown in diagram *A**, and the L-shaped piece *D*, fig. 2, is brought forward so the point *i* rests on the bar *B*, now resting in the *Y*'s. We turn the screw *j*, as *i* rests on *B*, until it is in position to support the levers *m n*, as shown in fig. 3. It will be noticed that the levers *n m* can be turned back from *h* so we can manipulate the screw *j*; we now put the lever *m* down so it rests on the point *l*, and let *n* down so it rests on the point of *m*. We can now turn the screw *p* so as to bring the point of *n* near the center of the index *o*. The weight of *D'* will hold *D* pressed against the stud *g*, and the series of levers *h m n* will keep the point *i* down on the bar *B*. If, now, we turn *D* away back on the dotted line *f* (it will be remembered *D* turns on the screw *c*) and we change ends of *B*, we can instantly detect with great accuracy if both ends (or the middle) are exactly of the same size. And by revolving *B* in the *Y*'s we can ascertain if it is

perfectly round. In fitting up the parts shown in fig. 3, no extra pains in the way of accuracy need be observed, as all the parts are arranged to take up all lost motion by gravitation. It is well to make the levers *m* and *n* as light as is consistent with stability. The point of *i* should be steel, and hardened and tempered. We turn the bar (*B*) for our measuring tool as accurate as we can in our lathe, using the instrument just described for testing it for parallelism and truth in the round. We should next convert our lathe into an emery grinder, as the writer described in a former article, and increase the perfection of the bar (*B*) by this means until the testing device just described pronounces it a true cylinder 5 inches long and as near $\frac{3}{4}$ of an inch in diameter as is convenient. We next lead grind the bar *B* as follows: We grind the best flour of emery with coal oil into a very thin paint, and with a soft camel's hair pencil paint the bar *B* for about $2\frac{1}{2}$ inches of its length with a very thin coat of emery and coal oil. If, now, we heat up the bar *B* to about 450° F. (a pale, straw color of the steel) the coal oil will all evaporate and leave the simple emery adhering to the bar *B*. If, now, we take a cylindrical block of wood $1\frac{3}{4}$ inches in diameter and $1\frac{1}{2}$ inches long, and make a hole through the center $\frac{3}{4}$ of an inch in diameter, we can slip it on the bar *B*. At fig. 4 is shown the bar *B* in longitudinal section, and the block just described at *E E*. If we now wrap a stout piece of writing paper around the block *E E*, as shown at *t t*, we have a space shown at *u u* into which we pour melted lead. The coat of emery paint mentioned above is supposed to extend on *B* from the dotted line *s* to *v*. The lead band is supposed to embrace *B* from the block *E E* to the line *w*, a distance of about 2 inches. After the lead ring *u u* is cold, it, together with *B*, should be soaked in coal oil for 3 or 4 hours, when the lead band can be forced to slide on *B*. This lead band should be worked back and forth on the bar *B* to grind it into pretty near a perfect cylinder.

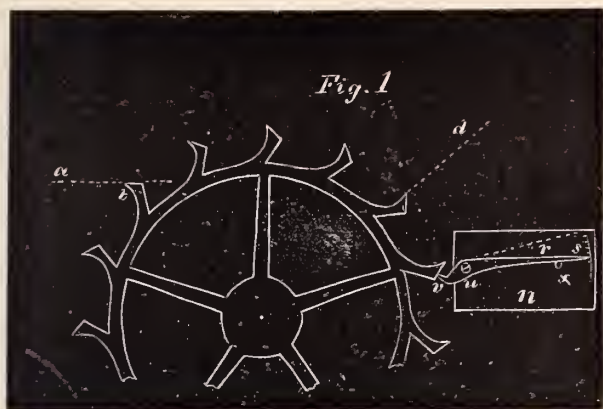
Problems in the Detached Lever Escapement.

BY DETENT.



WE LEFT our attachment for restoring the teeth of club tooth scape wheels at the point where we could restore the locking face. We will now see about restoring the impulse plane of the tooth. In my illustration in January, 1886, number, the indicating hand *r*, and the plate *n* on which it was mounted, was not drawn reverse on the block, and consequently is reversed in the cut. But the correct situation is shown in diagram *F*** at *v*. In making an arrangement for testing the impulse of our teeth, we need no changes except in the piece *n* (January number) and the indicating hand. The writer is sorry to say that the *r* is omitted in the cut, but *r* would indicate the long end of the lever, of which *v* is one end. There are several methods or devices by which we could determine the angle and extent of the impulse face of the tooth, but in the present problem it is sufficient to restore the teeth to about what they were originally, and this, in a great degree, will depend on the judgment of the workman. And here is where the educated workman—I mean educated in his trade, *i. e.*, having a knowledge of the principles involved, and having the ability to remedy defects intelligently. We will let the device for restoring the teeth rest for a moment, while we consider the bearing of any alteration in the form of the teeth. Suppose we find it inconvenient, we'll say impossible, to restore the impulse face to exactly the original form and extent. We have no new scape wheel which we can substitute for the one in hand. Well, what shall we do? In restoring our scape wheel we diminish the impulse face of our tooth. The solution to this problem is to put in one or both new pallet stones, having them thicker, and making the increased thickness of the pallet compensate for the diminished face of the impulse on the tooth. A workman who can grind his own pallet stones can do this very easily, the stone which

comes out being all right for another watch. A stock of pallet stones of different thicknesses is indispensable, at any rate, for in many instances the change of a pair of pallet stones will make a great difference in the motion of a watch. The idea that a watch which comes from a factory is as good as it can be, should be got rid of. The skillful workman sees instantly if an escapement is wrong or defective, and proceeds to correct it in an intelligent and workman-like manner. In the present instance, what we want is to restore our scape wheel to a good working condition, and the first great essential for this is to establish a perfect uniformity of size and shape in our scape wheel teeth, and then, if necessary, bring (by changing) the pallets to conform with it. To resume our device for restoring the teeth: We bring our scape into a position so the face of the impulse is nearly horizontal, as shown at the dotted line *a*, fig. 1.



The reader will remember that the slide on which the file worked, described in January number, was capable of being raised and lowered, and also turned, as shown at *j*, diagram *H** (January number). We have now the tooth at *b*, fig. 1, ready to be faced off; the same filir *g* or grinding device described will answer every purpose. The arrangement for measuring the teeth shown at *n* (January number) will have to be changed, but only by changing the lever *r* for measuring the teeth. I have retained the same letters to represent the same or similar parts as were used in January number. The measuring lever *r*, fig. 1, should be shaped as shown at the end *v*; this end is filed and ground to a thin, blunt edge, as thin as will not indent and mar the face of the tooth. To use it, we file or grind the impulse face of the tooth on the line *a*, until we think it enough; then turn the scape wheel, guided by the index wheel as directed in former article, and file off all the teeth on the face until the point *v* will indicate the inner angle of the teeth all in the same position. If, now, we revolve the spindle of the lathe (of course, carrying the scape wheel), we will cause each tooth successively to lift the lever *r* to somewhat the position of the dotted line. If we notice the point on the scale or index *s*, where each tooth in succession raises the lever *r*, and adopt the shortest one as the standard to which we bring all the rest, we must have our scape wheel true. To grind or cut away the back of the tooth, the piece *H* (January number) can be set to guide the file *F* correctly. To use such a device does not require one-fourth of the time it takes to read about it. Some ten years since a reward was offered by the British Horological Society for an instrument to test lever escapements, and various devices were offered, but with no very pronounced success, as far as the writer of this ever heard, and as he was at that time connected with one of our largest American watch factories, he thinks that if anything of importance was developed he would have heard of it. It seemed to him (the writer) that, farther than testing the scape wheel, such a device would be of comparatively little use. The imperfections of the scape wheel is the great lack of power in all the cheaper grades of watches, especially in club tooth scape wheels. And with any instrument in the "kit" of ordinary watchmakers, there is no way to test the club tooth scape wheel for inaccuracy. But with the instrument just described, if carefully made, all of its imperfections are found and located, and, what is better, can be corrected. When

I was describing the manner of drawing the club tooth escapement, I mentioned the fact that the rules given were not imperative, and that the impulse need not necessarily be divided between the tooth and the pallet, in the exact ratio laid down then and there; two-thirds of the impulse can be given to either the tooth or the pallet, and still not materially affect the action. The great advantages of the club tooth escapement lie, first, in its superior strength in the scape wheel; second, in permitting the pallet to pass in at the back of the tooth. And reducing the impulse face of the tooth in any moderate degree does not interfere with this property, and there is certainly no loss of power if the impulse face of the pallet is increased in proportion to the same amount as the impulse reduction of the tooth. The use of visible or exposed pallets facilitate the changing of the pallet stones; consequently, if one has a good stock of pallet stones of different thicknesses, it is quite easy to bring up a poor motion in almost any American watch. The writer grinds all his own pallet stones, and to make two or three dozen pallet stones is no very tedious job, and those in which the thickness is a little more than the average are just the ones we need. We have given the instructions for grinding and polishing single pallet stones, but when it comes to grinding up a dozen or two for a stock of exposed pallet stones, a few hints and instructions in addition will not be amiss; consequently, in our next we will do so.

Aluminum.



THE METAL aluminum is, perhaps, of all other metals, most widely diffused over the earth, while gold ranks next, strange though it sounds. The former is a constituent of nearly every kind of rock and earth, being found in clay, marl, loam, in fact, in every kind of earth, but never in a native condition, and the question of separating the aluminum from its manifold combinations has for the last sixty years engaged the attention of the chemists of all countries. The German chemist, Frederic Wöehler, was, in 1827, the first to obtain it in a metallic state, as a gray powder, and after many experiments eighteen years afterward, in 1845, he succeeded in fusing it into small lustrous globules.

Chemists have, since that time, made great progress in the manufacture of aluminum. The present process, however, is still too costly to make the use of the metal universal, although it is to be found in superabundant quantities. Its specific gravity being only, hammered, 2.67, and cast, 2.56, it is three times lighter than copper, and four times lighter than silver; it possesses a greater firmness than zinc, is a good conductor of heat and electricity, and when struck gives a clear, ringing sound; it resists humidity, neither loses color no luster on exposure to air, and may be reduced into different shapes by pressing, stamping, hammering, etc. As aforesaid, its use has until now been limited, and aluminum is employed only for ornaments, medals, spoons, forks, spectacle frames, mountings for opera glasses, etc. The price of the pure metal is \$10 per pound, that of silver a little more than \$12. We lately read in the circular of a London firm, A. P. Turner & Co., that aluminum commenced to exert a depressing influence on the price of silver.

The man who shall succeed in discovering a method by which aluminum can be manufactured cheaply will in a short time become a millionaire, as all nations are on the alert, and his crucible would become more valuable to him than a gold mine. Fully understanding the value of the invention, it stands to reason that the majority of the chemists of every civilized nation are uninterruptedly engaged in trying to solve this problem. A few years ago the news went through all the papers of both continents that a French chemist had discovered the method. Later information, however, proved its incorrectness.

Home papers at present say that a certain Mr. Cowles, of Cleveland, has been the lucky discoverer, and has found a method by which the price of aluminum will for the present be only 40 cents, and in the course of time it will be as low as 15 cents per pound. If this is actually true, we then stand face to face with one of the grandest achievements of modern times, practically considered, as aluminum would be employed in many cases where we have at present to use the cumbersome, ungraceful cast iron. We entertain some doubts, however, that Mr. Cowles has succeeded in solving this difficult question. The information that he would for the present

furnish the pound at 40 and subsequently at 15 cents, shows that his invention has not yet been fully perfected. But even at the price of 46 cents the metal would be cheap enough, and the price of silver sink down into the very bulb of the metallic thermometer. Owing to the great superabundance of aluminum, many of our alloys and metals will become almost obsolete—copper, brass, zinc, tin, silver, iron, etc.

We sincerely hope the information to be true, but we have so often been startled with these sensational items, that we have become to be "unbelieving Thomases."

Kew Observatory Watch Trials to October 31st, 1885.

The arrangements for rating watches mentioned in previous reports have been continued during the year with great success, and up to the present 367 watches have been tried, of which 39 were submitted by the owners, and 328 by the manufacturers or dealers.

The 302 watches received during the year were entered for testing in the following classes:—

For Class A, 254; Class B, 38; and Class C, 10. Of these 72 failed to gain any certificate; 6 passed in C, 60 in B, 110 in A, and 6 obtained the highest possible form of certificate, the Class A especially good.

In July, owing to numerous requests from manufacturers and others, a system of awarding marks to Class A Watches, indicating the degree of relative efficiency exhibited during trial, was adopted, being based upon plans already in use in the Geneva and Yale Observatories. In it the number of marks awarded to a watch that only just succeeds in obtaining an A Certificate is 10, but to an absolutely perfect watch it would be 100, made up as follows:—40 for a complete absence of variation of daily rate, 40 for absolute freedom from change of rate with change of position, and 20 for perfect compensation for effects of alteration of temperature.

As, however, the trials already in use do not comprise a test for the going of travelers' or explorers' watches, experiments are in

progress with a view of constructing apparatus to test the behavior of watches when kept in motion, as in the case of daily wear and traveling, in order to make a special examination on this point for watches submitted for trial by the Royal Geographical Society.

A series of tests for pocket chronographs has also been introduced, by special request of the Cyclists' Union.

The following table will indicate the nature of the trials to which ordinary certificates refer:—

| Position of Watch during Test. | For Certificate of Class | | |
|--------------------------------|--------------------------|----------|----------|
| | A. | B. | C. |
| Vertical, with pendant up..... | 10 days. | 14 days. | 8 days. |
| “ “ “ right..... | 5 “ | — | — |
| “ “ “ left..... | 5 “ | — | — |
| Horizontal, with dial up..... | 5 “ | 14 days. | 8 days |
| “ “ “ down..... | 5 “ | — | — |
| “ at temp. 85° F..... | 5 “ | 1 day. | — |
| “ “ 35° F..... | 5 “ | 1 “ | — |
| Not rated..... | 5 “ | 1 “ | — |
| Total duration of test..... | 45 days. | 31 days. | 16 days. |

Results of Watch Trials. Performance of the Watches which stood the highest in each class of marks during the year.

| Watch deposited by | Number of Watch. | Balance spring, &c. | Mean daily rate. | | Mean variation for 1° F. | Difference between pendant up and dial up. | Mean difference of rate. | | | Difference between extremes of daily rate. | Marks awarded for. | | | Total Marks, 0-100. | Character of Test. |
|---------------------------|------------------|------------------------|------------------|-------|--------------------------|--|--------------------------|-------|-------|--|--------------------|-------|--------------------------|---------------------|--------------------|
| | | | secs. | secs. | | | secs. | secs. | secs. | | secs. | secs. | Daily variation of rate. |  |  | Change of rate with positions. | Temperature compensation. |
| E. F. Ashley, Clerkenwell | 03267 | Overcoil, fusee..... | -1.9 | ±0.4 | 0.04 | -1.2 | -0.1 | -1.5 | +2.0 | 4.75 | 31.8 | 37.0 | 17.3 | 86.1 | Class A. |
| V. Kullberg, London.... | 2901 | Overcoil, fusee..... | +0.8 | ±0.5 | 0.04 | -0.7 | +0.2 | +1.2 | -0.9 | 7.5 | 30.2 | 36.9 | 17.3 | 84.4 | “ |
| Baume & Co., London... | 2262 | Overcoil, going-barrel | +2.2 | ±0.4 | 0.07 | -1.9 | -1.5 | -1.3 | +2.1 | 8 | 31.4 | 36.5 | 15.3 | 83.2 | “ |
| Baume & Co., London... | 2266 | Overcoil, going-barrel | -2.7 | ±0.6 | 0.03 | -0.7 | -1.8 | -2.1 | +1.5 | 5 | 28.0 | 36.2 | 18.0 | 82.2 | “ |
| E. F. Ashley, Clerkenwell | 03033 | Overcoil, fusee..... | +0.4 | ±0.4 | 0.07 | -0.8 | -2.4 | +0.1 | -4.1 | 7 | 32.2 | 33.4 | 15.3 | 80.9 | “ |
| Baume & Co., London... | 2259 | Overcoil, going-barrel | +0.5 | ±0.5 | 0.06 | +1.1 | +0.7 | -1.8 | +2.4 | 7.5 | 29.4 | 34.8 | 16.0 | 80.2 | “ |
| D. Buckney, Clerkenwell. | 15017 | Overcoil, going-barrel | -0.2 | ±0.4 | 0.10 | +2.0 | +4.5 | +1.0 | -1.5 | 8 | 31.4 | 34.8 | 13.3 | 79.5 | “ |
| G. Carley & Co., London | 46937 | Cylindrical, fusee.... | +4.0 | ±0.4 | 0.12 | +3.4 | +2.0 | +3.3 | +1.2 | 7 | 32.0 | 35.4 | 12.0 | 79.4 | “ |
| G. Carley & Co., London | 46991 | Volute, going-barrel.. | -5.7 | ±0.4 | 0.09 | +2.5 | ..... | ..... | ..... | 6.5 | ..... | ..... | ..... | ..... | Class B. |
| W. Holland, Rockferry. . | 3552 | Overcoil, going-barrel | +3.0 | ±0.5 | ..... | -1.0 | ..... | ..... | ..... | 2.5 | ..... | ..... | ..... | ..... | Class C. |
| W. Holland, Rockferry... | 3340 | Overcoil, fusee..... | -1.5 | ±0.7 | ..... | -1.0 | ..... | ..... | ..... | 3 | ..... | ..... | ..... | ..... | “ |

Foreign Gossip.

FILTHY LUCRE.—The wealthy Caxton banker, Han Qua, is estimated worth about one billion and one-half.

IN AN "ARTICLE DE LUXE" STORE.—Lady: "Ah, what a beautiful vase; is it antique?" Salesman: "No, my lady, it is modern." "What a pity; if antique it would be so beautiful."

MARRIAGE PRESENT.—The most valuable present which Princess Marie, of Orleans, received on her marriage, was a magnificent rivière of diamonds, valued at £10,000, which was given by the Duc d'Aumale. It was one of the wedding presents of the late Duchesse d'Aumale.

HONORS TO THE DEAD.—The volunteer fire brigade, a creation of M. Grossmann, lately celebrated their silver jubilee, and their first act of piety was to handsomely decorate the grave of this eminent horologist. "And, when dying, leave behind us, footprints in the sands of Time."

EFFECTS OF OLD TIME WATCH OIL.—M. Grandjean records that in former times, when olive oil was used for lubricating watches, a watch gradually went slower as the oil got thicker; a different result, however, is obtained at present when watch and clockmakers use animal or mineral oils; a slight advance in rate is generally observable during the first few months.

NEW DIAMOND FIELDS.—Encouraging reports continue to arrive from the diamond diggings last year found at Bingera, New South Wales, and enthusiasts predict that they will equal in richness the famous diamond mines of Kimberley, South Africa. The diggings were of the kind called "dry" diggings on account of the scarcity of water; accident, however, led to the discovery of a large subterranean stream fifty or sixty feet below the surface of the ground.

VELOCITY.—An exchange says that the main wheel of a watch makes 4 revolutions in 24 hours, or 1,460 in one year; the second, or center, 24 revolutions in 24 hours, or 7,760 in a year; the third wheel, 192 in 24 hours, or 69,080 in a year; the fourth wheel, which carries the seconds hand, 1,440 in 24 hours, or 525,600 in a year; the fifth, or scape wheel, 12,964 in 24 hours, or 4,728,400 revolutions in a year; while the beats or vibrations made in 24 hours are 388,800, or 141,812,900 in a year.

ORIGIN OF BALLOONS.—It is said that the origin of balloons is due to Madame Montgolfier. She had washed her petticoats to wear to a great festival on the next day, and hung it over a chafing dish to dry. The hot air swelling out the folds of this garment of mischief, lifted it up and floated it. The lady was astonished and called her husband's attention to the sight. It did not take Montgolfier long to grasp the idea of the hot air balloon. Ladies' petticoats have done worse things than that.

SUPERSTITION OF A QUEEN.—The queen of Italy is superstitious. Victor Emanuel once presented her with eight rows of incomparable pearls, each the size of a cranberry, which she wears around the neck on gala occasions. Some time ago she mislaid them and they were supposed to be lost, and the king was shot at about the same time—which disaster was, to her superstitious mind, caused by the loss of the pearls. She was so happy as to find them again, however, and they once more adorn her beautiful neck.

STRANGE FINDS.—The Bank of England has had no end of valuables committed to its keeping. The vaults of its establishment hold moldering chests, deposited there for the sake of safety, and apparently forgotten by their owners. In 1873 one fell to pieces from sheer rottenness, exposing to sight a quantity of massive plate and a bundle of yellow papers. The latter proved to be a collection of love letters of the period of the Restoration, which the directors were enabled to restore to the lineal descendant of the original owner.

VERY TRUE.—An exchange says "everybody is pleased at the prospect that better times are about to set in." This is an excellent remedy for bettering bad times; just so long as everybody whines and complains about bad times, will times be bad, and will grow worse with the complaints of merchants; but as the wish is the father of the deed, times will improve with the greater hopefulness of the people when they begin to see the silver lining to the darkest cloud. Optimism is the best way to view the little ups and downs of this life in.

WATCH REPAIRING.—A correspondent to a contemporary says that he had a watch brought in some time ago which "took the cake." It certainly had been in the hands of a honey. The cock and foot jewels were both gone, and in their place was soft solder with holes broached in for the pivots to run; the holes being three or four times larger than the pivots of the balance staff. The watch was a G. M. Wheeler, key wind, and the soft solder hole jewels were made by a country watchmaker, whom the majority of the community think as honest as possible, etc.

NEW STYLE OF CLOCK.—Clocks are apt to be located and disposed of in *bizarre* and sometimes repulsive forms—in the stomachs of a corpulent man, locomotive, light tower, and thousand and one shapes, both fanciful and uncouth, and it is but seldom that anything really new and tasteful is introduced. The following description, however, sounds as if the clock, about to be patented in Germany, belongs to the latter original class. The clock is in the shape of a small drum, upon whose head the figures are represented by painted flowers; two handsomely decorated bees, one large and the other small, indicate the hours and minutes by gliding from one flower to the other. These two neat little insects stand in no visible relation to each other or to the clock work, but are moved along by a magnet located behind them and underneath the drum head.

METALLURGICAL TERMS.—The terms "anode," "anelectrode" or "positive electrode" for the positive pole of the battery—that is, the wire which proceeds from the copper elements in a battery, were first employed by Faraday; and "cathode," "cathodelectrode" or "negative electrode," for the negative pole—that which proceeds from the zinc element. Professor Daniell, however, objecting to the terms "anode" and "cathode," proposed the adoption of "zincode" and "platinode," to distinguish the positive and negative poles; but as the elements of a battery are not necessarily composed of zinc or platinum, and as independently of the great weight which must always attach to any system propounded by Mr. Faraday, it would sound rather unmusical to speak of "leadodes," "carbonodes" or "copperodes" when describing the poles of a battery with an element of lead, carbon or copper, it is preferable to adhere to Faraday's nomenclature.

ADVANCE OF PHOTOGRAPHY.—Rear-Admiral Mouchez, Director of the Observatory of Paris, recently laid before the Académie des Sciences an excellent negative of a photography of a portion of the "Milky way" (*Via lacta*), taken with the apparatus constructed by the astronomer Henry and engineer Gauthier. More than 5,000 stars could be recognized with great clearness through a microscope magnifying from 20 to 30 times. This result removes all doubts about the possibility of taking stellar photographs which will give all the stars visible even through the most powerful telescopes. In order to obtain photographs of the 41,000 superficial degrees of the celestial vault, it would require 6,000 uniformly large plates. From 6 to 8 observatories, suitably located, might make an arrangement, and obtain a complete stellar map in less than six years—maps which would contain more than 20 million stars down to the 15th magnitude. This would perhaps be the most important work of the age—an inheritance bequeathed to the astronomers of the future, giving the true position of the stars during the 19th century, which would exclude all errors and misunderstandings.

Workshop Notes.

PLIABLE GOLD.—If you desire to have a pliable 14-karat gold for stamping, take a little Dutch metal (Germ. *Rauschgold*) together with the alloy. First melt the gold with the alloy, roll the ingot into a thin sheet; cut it up again and place Dutch metal and gold into the crucible and smelt.

TO ENGRAVE ON STEEL.—Heat slightly the piece to be engraved; rub it with beeswax so as to obtain a thin covering when cold; engrave on the wax so as to reach the metal; soak in strong vinegar, then sprinkle over the engraving corrosive sublimate wet with vinegar; in five minutes wash and melt off the wax.

TO DRILL AND ORNAMENT GLASS.—Glass can easily be drilled with a steel drill, hardened, but not drawn, and driven at a high velocity. Holes of any size, from the sixteenth of an inch upward, can be drilled by using spirits of turpentine as a drip; and easier still by using camphor with the turpentine. Do not press the glass very hard against the drill. If you desire to ornament glass by turning in a lathe, use a good file and the turpentine and camphor drip, and you will find it an easy matter to produce any design you choose.

INFLUENCE OF OIL ON PIVOTS.—Mr. Glasgow says that the quality of the oil has much to do with the blackening of the pivots, and those which have the greatest friction will become discolored first. In ordinary watches, jeweled in the third and fourth wheel holes, the lower third wheel pivot will be the blackest, it having the greatest friction from being so close to the action of the center wheel in the pinion; and if the center holes be jeweled, the bottom pivot will generally be found more discolored than the top one from the same cause.

TO TEMPER DRILLS.—Select none but the finest and best steel for your drills. In making them, never heat them higher than a cherry red, and always hammer till nearly cold. Do all your hammering in one way, for if after you have flattened out your piece you attempt to hammer it back to a square or round, you will ruin it. When your drill is in proper shape, heat it to a cherry red and thrust it into a piece of resin or into mercury. Some use a solution of cyanuret of potassium and rain water for tempering their drills, but the resin or mercury will give better results.

COLORING GOLD ALLOYS.—The following are a few colored gold alloys of tolerable simplicity; before we give them we shall premise them with the statement that all colored alloys are difficult to compose and work, and any person not a regular jeweler had better keep his hands from either compounding or working them: *Red*: 18 parts pure gold, 6 parts copper; *yellow* is pure (24-karat) gold; *green*: 18 parts pure gold, 6 parts silver; *white*: 12 parts pure gold, 12 parts silver; *blue*: 18 parts pure gold, 6 parts iron. This last alloy is difficult to make. Melt the gold under borax, and add the iron in bits of fine wire free from rust.

DRAWING TEMPER FROM PINION.—When taking the temper from a pinion for pivoting, be very careful to confine the heat as much as possible to the spot necessary to be softened. If the heat is carried so far that a scale will peel off the leaves, the pinion is practically ruined, as no amount of repolishing can restore the original shape of the leaves. But a slight coloring is easily removed. Some workmen use a dilute solution of muriatic acid—two or three drops in a spoonful of water. In this they dip for a short time the discolored part of the pinion, assisting the operation by rubbing with a piece of pegwood dipped into the same solution. Others use a similar solution of sulphuric acid in the same manner. But the use of acids on watch movements is hardly to be recommended even in the most careful hands. A better way is to use a properly shaped piece of pegwood with fine oilstone dust, finishing with crocus. If the pinion has not been overheated, the polish can easily be restored in this manner.

NICKEL PLATING BATH.—Plazanet employs a bath composed of 87.5 parts of sulphate of nickel, 20 parts of sulphate of ammonia, 17.5 parts of nitric acid, and 1,350 parts of water. A bath much used in France is formed of a solution of 4 parts of nitrate of nickel in 4 of liquid ammonia, and 150 of water in which 50 parts of sulphate of soda have been dissolved. With a moderately weak current the operation is ended in a few minutes. There is no need to interrupt it by taking the objects out and brushing them. When the film of nickel is of sufficient thickness, the objects are withdrawn from the bath and dried in sawdust.

TO HARDEN STEEL WITHOUT SCALING.—Watchmakers are sometimes greatly annoyed when hardening small polished steel work by its disagreeable scaling, which, of course, destroys the polish. The only way to prevent this is by protecting it against oxidation, or better, against contact with air. Some workmen warm the piece enough to melt common soap and coat it with this, then wrap it in thin metallic foil of some kind while heating, and throw the whole into water to cool it. Others take a metal tube, clock key, clay pipe bowl or other piece having a suitable cavity in it, arrange a loose cover over it or a closing plug in it, then put the piece to be hardened into the cavity, pack around it fine charcoal dust, lay on the cover, heat up to a cherry red throughout, then empty the contents into the tempering bath, taking care to hold it as near the water as possible so that the piece will have the slightest exposure to air on the way to the water. Many other ways have been devised, but the kernel in the nutshell is: protect the piece against contact with the air.

RESISTANCE OF AIR TO PENDULUMS.—The resistance offered to a body in motion is proportioned to its dimensions and the square of its velocity. One body moving with the same velocity of another one, and the surface of which is only half of that of the other one, suffers a resistance amounting to one-half of that borne by the larger body. The velocity and weight of the pendulum determine the magnitude of its motion, and by them is overcome the resistance of the air. If we suppose the velocity of two pendulums to be the same, only weight can alter the moving power, and the greater the relative weight, the more power must be present to conquer the resistance of the air. Hence follows: That for a pendulum a body of great specific weight must be employed, and that the resisting surface of the body must be made as small as possible. Since its spherical form, of all others, is that which decreases most the surface of a body, taking the mass as such, it appears to be especially adaptable for the vibrating body of the pendulum. But the motion of the latter occurs only upon two sides, therefore experience has demonstrated that the lentil-shape is more suitable than the spherical, and for this reason it is generally employed.

BROKEN SCREWS, ETC.—While speaking of blueing steel parts and screws, Mr. Grosch says: "What an eyesore it is to see in a recently repaired watch its screws, if old, broken, disfigured and scratched, or if lately put in, each one has its own distinctive color, and all of them iridescent in all the hues of the rainbow, and more, too, while it is so easy to give them all a uniform, attractive color. Having hardened the head, it is ground clean, then polished with a zinc file and rouge and plenty of oil, so as not to leave the file dry at any part; it is next washed in soap and water and then put into alcohol, or, without washing, into benzine; when taking out be careful not to have any grease adhering to it; next put it on the blueing plate with brass filings, or upon a brass plate, and let it turn blue, and withdraw it at the proper moment. Let the repairer bear in mind to put no soft screws into a watch; when he sees one let him take it out and harden it, especially the small screws in the stopwork, bridges, etc. Excusable only is a soft screw in the click spring of a Swiss watch, because if it should accidentally be broken, if hard, it might be difficult to be gotten out. Aside from this one, all other screws should be tempered, whereby the watchmaker will save himself much future vexation.

Trade Gossip.

L. Adler & Co. have removed to No. 46 Maiden Lane.

Mr. F. Kafferman has removed from 81 Nassau street to 192 Broadway.

Mr. Henry Fera arrived from Europe in the steamer *Fulda*, February 13.

Mr. W. M. Preston will remove April 1 from Scoharie to Round-out, N. Y.

Mr. Joseph F. Chatellier has removed from 694 Broadway to No. 48 Maiden Lane.

Mr. G. Francesconi, importer of silver filigree jewelry, has removed to 30 Front street.

Mr. H. C. Hardy, of H. C. Hardy & Co., sailed for Europe in the *Fulda*, February 17.

Mr. J. N. Bonnet, of Mulford & Bonnet, sailed for Europe Feb. 27, by the steamer *Servia*.

Mr. W. F. A. Woodcock, late of Cumberland, Md., has opened a jewelry store in Circleville, Ohio.

The Excelsior Sign Company, of Chicago, has removed from 124 Fifth avenue to 124 Dearborn street.

The old firm of Saxton, Smith & Co. having been dissolved, C. Sydney Smith succeeds to the business.

Mr. George A. French, representing William S. Hedges & Co., sailed for Europe in the *Aurania* Feb. 13.

Mr. T. Le Boutillier, of Le Boutillier & Co., arrived home from Europe February 14, in the steamer *Oregon*.

Mr. E. A. Thrall, No. 3 Maiden Lane, has gone South for a business trip, and will be gone for several weeks.

The Keystone Watch Case Company and N. H. White will occupy offices at No. 12 Maiden Lane on and after May 1st.

Mr. George Uibel has admitted to partnership Mr. R. P. Barber, and the firm will hereafter be known as Uibel & Barber.

The firm of Hamrick & Son, of Philadelphia, has been dissolved. The business will be continued by Mr. Oliver M. Hamrick.

W. J. Cole & Co. is the designation of a new firm located at No. 3 Maiden Lane, and engaged in the manufacture of jewelry.

Mr. M. A. Myers, of the firm of S. F. Myers & Co., has gone to Florida and the Bermudas, on a six weeks' well-earned vacation.

Mr. George F. Gleason, formerly of the firm of Field & Co., died in Paterson, N. J., Feb. 19, of paralysis, in the 45th year of his age.

The firm of Stilson & Rounds, of Anniston, Ala., has been dissolved by mutual consent. F. S. Rounds will continue the business.

Strauss & Moos is the name of a new firm organized for dealing in diamonds and fine jewelry. They are located at 41 and 43 Maiden Lane.

Mr. Alexander C. Chase, formerly with Baldwin, Sexton & Peterson and T. W. Adams & Co., has made an engagement with A. Luthy & Co.

Mr. Samuel Swartchild has issued a new catalogue of tools and material, which is now ready for distribution, and can be had on application.

The Cheshire Watch Company, of Cheshire, Conn., reports that business is excellent with them, and that a ready sale is found for all their products.

The firm of J. B. Bowden & Co. has been dissolved, and a new one organized. The members are Joseph Bowden, J. B. Bowden, and M. L. Bowden.

Mr. Albert Friedenthal, late of the firm of Friedenthal & Rypinski, will spend the summer in recreation, but announces that he will engage in business in the fall.

Mr. C. E. Hastings, of Carter, Sloan & Co., is making an extended trip to California. He is well known to most of the dealers there, and is sure of a cordial reception.

Aikin, Lambert & Co. make a special announcement of the Longine and Agassiz watches, and invite the trade to inspect their goods, which embrace full lines of these watches.

Mr. Edward J. Fisher, of the firm of Fisher & Sons, was married January 20th, to Miss Mary F. Delaney of this city. The wedding took place at the residence of the bride's parents.

The firm of T. B. Hagstoz & Co., of Philadelphia, has been dissolved. The gentlemen composing it, Mr. T. B. Hagstoz and Mr. James Burdick, will continue in business each for himself.

Harrison B. Smith, of the firm of Alfred H. Smith & Co., is making a prolonged tour in Europe in the interests of his firm, selecting diamonds and other precious stones desirable for this market.

Blancard & Oberlander have dissolved partnership by mutual consent, Mr. Oberlander retiring. The firm will be succeeded by Blancard & Co. and the business will be continued at the old stand.

Martin, Copeland & Co. have introduced a line of new designs in plain gold and band rings which are very attractive. They have also, as usual, a full supply of gold chains, of all patterns and styles.

Mr. B. H. Knapp, of the firm of Smith & Knapp, importers of diamonds, sailed for Europe Feb. 13, in the steamship *Aurania*. This enterprising house will add largely this year to their diamond department.

C. T. Kayner, a jeweler of Jamestown, N. Y., met with a distressing death last month. His house took fire in the night, and both he and his wife were consumed in the flames. They were both about 60 years of age.

Copies of the Constitution and By-Laws of the National Association of Watchmakers and Jewelers, also application blanks, can be had upon application to the Secretary, Mr. H. H. Berg, 127 State street, Chicago, Ills.

Among those who favored us with calls recently were B. A. Bell, of Newberne, N. C.; Henry Benham, of the firm of Benham & Griger, of Toronto, Canada; F. C. Richard, of Bellefort, Va., and G. L. Ausbacher, Wilkesbarre, Pa.

Bogers & Bro. have introduced some new and handsome designs in silver ware, and invite especial attention to their goods. Their advertisement exhibits several new patterns of table cutlery, which have already become popular.

Attention is called to the art work in iron, brass and copper, produced by the Gorham Manufacturing Company. This work includes ware for the table, as well as purely decorative pieces, and is having a good sale in this section of the country.

Foster & Bailey have introduced many new styles in their sleeve buttons, known as the Mount Hope button. It is a new and simple device for clasping, is secure when affixed, and easily detached by simply turning the button-head half way around.

F. I. Marcy & Co., have introduced various new styles in their Acme Lever sleeve buttons, among which are new stone intaglio and cameo, enameled gold front, gold inlaid with pearl, Mikado buttons, and various other new designs too numerous to mention.

Mr. Robert A. Johnson, one of the Vice-Presidents of the League, has been confined to the house by illness for some weeks. He is now reported to be convalescent, and his many friends hope soon to see his genial countenance on the street again at an early day.

The Centennial railroad speed indicator, patented by Cross & Beguelin, January 5th, 1886, is the latest novelty out, as well as being a useful addition to their celebrated chronograph. By extra numbers on the dial it enables a traveler to tell very readily the rate of speed a train is going, and will always be found to be accurate. It has met with great favor by the trade, and although a recent invention, Messrs. Cross & Beguelin have a large demand for them.

The firm of Alling & Co., composed of Horace and William R. Alling, was dissolved Jan. 15, Horace Alling retiring. The firm will be continued under the same designation by William R. Alling, who has admitted to partnership John D. Alling and Frank M. Welch.

The Unger Brothers, 9 Maiden Lane, have ready for the spring trade not only new patterns in flexible bracelets, provided with a patent snap, but novelties in gold and platinum jewelry. Their round pins and antique watch chains also represent quite new styles.

Buyers coming from the other side report that the price of diamonds is steadily advancing in the markets of Europe, and that there is a great scarcity of such as are desired for the American market. Sales of gems by dealers here have been numerous, and at good prices.

Cox & Sedgwick have introduced many new designs in onyx goods for the spring trade. An indication as to what they look like can be obtained from their advertisement in this issue. Their goods are so well known to the trade that commendation would be superfluous.

Mr. August Oppenheimer, of Oppenheimer Bros. & Veith, sailed for Europe Feb. 27, in the *Servia*. This is Mr. Oppenheimer's second visit to Europe in the past two months for the purpose of buying diamonds, an indication that the demand for precious stones in this country is active.

Alston & Maxwell have purchased the store and stock formerly owned by J. Gansel, at Tuscaloosa, Ala., Mr. Gansel having removed to Minneapolis. The first named firm is making large additions to the stock, and propose to carry full lines of everything pertaining to the jewelry business.

The plant of the Lancaster Watch Company has been purchased by a new company, organized for that purpose, and known as the Keystone Standard Watch Company. The new company is organized on a basis of \$500,000 capital, over \$300,000 of which has already been subscribed for.

Mr. Otto Young, of Chicago, has resigned the positions of treasurer and member of the executive committee of the National Association of Watchmakers and Jewelers. Mr. Charles Rowe was chosen to succeed him as treasurer, and Mr. Julius Schnering takes his place on the executive committee.

Professor William A. Anthony, of Cornell University, recently tested a watch in a case protected by Giles' anti-magnetic shield, and found it a perfect and practicable protection against magnetic influence. His certificate, setting forth the details of his experiments, will be found in our advertising columns.

E. B. Golding & Co., of Minneapolis, were sufferers by fire in the store, January 22. Their loss by fire was only about \$500, but in a published card they intimate that thieves took advantage of the occasion, and secured some booty from their stock. They have arranged to go right ahead with their business.

Messrs. Champenois & Co., 5 Maiden Lane, manufacturers of fine gold jewelry, are showing new and taking designs in white stone and imitation pearl jewelry well worth seeing. This firm has also in stock a novel charm for bracelets and watch chains, known abroad, where it is very popular just now, as the "oudja" amulet.

Messrs. H. Z. & H. Oppenheimer, of 25 Maiden Lane, are manufacturing ear rings in gold settings, containing selected solar brilliants. The brilliants are cut in four sizes only, $\frac{1}{2}$, $\frac{3}{4}$, 1 and $1\frac{1}{4}$ karats, and it is claimed by Messrs. Oppenheimer that the carefulness of selection of the brilliants make these goods very desirable.

B. & W. B. Smith, the celebrated manufacturers of show cases and interior fixtures, have recently issued an elaborate catalogue, which should be in the hands of every person who contemplates making any changes in the interior arrangement of their establishments. Some of the most elegant jewelry establishments in the country have been fitted up by them. Plans and specifications submitted on application. Attention is directed to their advertisement on another page.

A seizure of a stock of jewelry at No. 66 Nassau street, owned by I. Emrich, was made on July 28 last by custom house officers. The ground of seizure was fraudulent undervaluation. The case was given to the United States District Attorney for prosecution, but during last month it was settled through the payment, by Emrich, of \$3,500.

At the annual meeting of the Jewelers' Board of Trade the following was adopted: "Resolved, that the Jewelers' Board of Trade urgently and respectfully request all the members of Congress representing the City of New York to vote for and use their influence toward suspending the act of February 28, 1873, regulating the coinage of silver."

Mr. W. A. Moore, manager for the Dueber Watch Case Manufacturing Company, celebrated his silver wedding February 13. A large circle of friends gathered at his house at Newport, Ky, to congratulate him upon the auspicious event, and many of them left substantial evidence of their appreciation of him as a gentleman and business man.

Mr. Joseph Stern, of the firm of Stern & Stern, who has been sick for several months, recently had a surgical operation performed to enable the doctors to treat an abscess that had formed in his abdomen. The operation is regarded as having been successful, and the attending physicians are confident that their patient will soon be able to attend to business.

Mr. Wm. H. Ludeman has removed from 75-7 Nassau street to 41-3 Maiden Lane (the Knapp building). Attention is called to a letter printed in his advertisement, wherein a gentleman compliments him upon the successful manner in which he changed a key winding watch to a stem winder. Mr. Ludeman has been extremely successful in doing work of this kind.

Mr. Herman A. Perkins and Mr. Joseph Pyne, of Harrisburg, have formed a partnership for the purpose of conducting the jewelry business in that city. Since the death of William Brady, the well known jeweler, Mr. Perkins has continued his business in the interests of his widow, but as she desires to retire, the new firm is organized to take the place of that house.

Reed & Barton offered a special prize at the poultry show last month for the incubator hatching out the largest number of chickens during the week. There was a spirited contest, at least a dozen incubators being entered. The prize was an elegant silver cup, sixteen inches high, engraved and decorated with appropriate poultry emblems. It was the finest prize of the exhibition.

The *Denver News* gives the estimated production of Colorado mines for 1885 as follows: Gold, \$5,000,000; silver, \$13,000,000; lead, \$4,000,000; copper, \$500,000. The product of 1884, given by the Director of the Mint in his report, was: Gold, \$4,250,000; silver, \$16,000,000; thus showing a gain in the last year over the previous year of \$750,000 in gold, and a loss of \$3,000,000 in silver.

Mr. Donald Manson, lately manager for the American Watch Company at Sydney, was tendered a picnic and banquet on the occasion of his departure for the United States in December last. A large number of prominent citizens participated in the festivities of the occasion. Many complimentary speeches were indulged in, to which Mr. Manson responded in an appropriate manner.

In the matter of the Jewelers' Mercantile Agency (Safford's) against the New York Jewelers' Board of Trade, wherein Mr. Safford charges the Board with having copied his book of ratings, the Court heard argument upon the question of the injunction prayed for, and reserved its decision. The controversy does not involve the Board of Trade so much as its Secretary, J. R. D. Graham, who compiled the Board's book of ratings. Mr. Graham is prepared to defend his action in the matter, and claims to be able to substantiate his assertion that he did not copy Safford's book in any particular. Meantime the Board of Trade is, comparatively speaking, a disinterested observer of the legal controversy, and continues to discharge its functions with satisfaction to its members.

A very elegant and useful show case for the display of optical goods will be found illustrated in the advertisement of Mr. Julius King, in the present issue of THE CIRCULAR. It is so arranged that samples of goods can be displayed on three sides under glass, while the interior contains drawers in cabinet form for holding stock. This case has no equal for the purposes for which it is designed.

Mr. Charles W. Schumann, of 24 John street, the owner of the famous Russian oil painting that has attracted so much attention in art circles, and which was recently noticed in THE CIRCULAR, was so overrun with sight-seers that he was obliged to charge an admission fee of twenty-five cents. The receipts have thus far exceeded \$1,000, all of which Mr. Schumann has generously donated to various charitable institutions in New York and Brooklyn. The picture is a rare and beautiful example of art work, and no one should miss seeing it.

At a recent meeting of the Jewelry Board of Trade of Providence the following named gentlemen were elected officers for the ensuing year: President, Dutee Wilcox; First Vice-President, F. I. Marcy; Second Vice-President, J. L. Sweet; Treasurer, John A. McCloy; Secretary, G. E. Emery. The following named, with the officers, constitute the Board of Directors: R. S. Hamilton, Jr., William M. Fisher, B. W. Dodge, W. H. Wade, W. R. Dutemple, D. S. Spaulding, E. I. Franklin, S. E. Fisher, E. S. Horton, N. B. Barton, and H. A. Bushee.

In the February issue of THE CIRCULAR we gave an account of the robbery of the store of Alex. Allen, of Saltsburg, Pa., in which it was stated that a policeman named Jones caught the thief as he was crossing the river, and held him under water until he was drowned. We were all right, except that the policeman's name was Murphy, instead of Jones, and the thief was drowned by getting into a swift current and deep water, going to his death with his revolver pointed at the officer, who could not help him for fear of being carried off by the current himself. The thief had fourteen watches tied on a string around his body when taken from the water.

A stranger entered Baker's jewelry store, at Kansas City, recently, and asked to see some diamonds. Upon being shown them he grabbed a handful and started for the door. One of the two clerks present, named R. H. Mohl, jumped over the counter and clutched the robber, who beat him over the head with a revolver. The other clerk, A. M. Ohler, came to Mohl's assistance, and was shot in the neck. The robber then got away and ran. Cries on the street of "Stop thief!" brought out C. H. Surrels, a carpenter, who tried to stop the thief and received a bullet in the mouth, which lodged in the back of his neck. The unknown robber then escaped, leaving a hat as the only clue to his identity. The diamonds were recovered.

The Washington correspondent of a Chicago paper says that a diamond broker in the former city has just secured a \$40,000 necklace ordered from him long ago, the stones of which he has been a year in collecting. It is not for Mrs. Whitney, as some of the newspapers have said, but for the wife of a private citizen of Washington, whose name the broker will not give. The necklace has forty-one blue-white stones, and it is said to be the largest collection of absolutely perfect gems that has ever been made in this country. The central gem, and the only odd one, is seven karats in weight, and cost \$2,500. The rest are all exact pairs of graduated sizes, and the smallest cost \$400 each. The broker who has made this collection sought the whole world over for these stones, as his contract stipulated that each one should be absolutely faultless, and he says he has examined \$10,000,000 worth of jewels to complete the selections. There are many larger and more valuable stones in Washington than appear in this necklace, but in perfection of the individual stones, and the exactness of the matching, there is nothing in the world to compare with it—at least, so says the broker.

The co-partnership heretofore existing between Edward Todd, Edward Todd, Jr., Joseph Monaghan, Henry C. Potts, was dissolved February 1st, in consequence of the death of Mr. Joseph Monaghan. Edward Todd will sign in liquidation. A new co-partnership has been formed, under the firm name of Edward Todd & Co., and will continue the business of the late firm of Edward Todd & Co., assuming the liabilities and collecting the indebtedness due that firm. The members of the new firm are: Edward Todd, Edward Todd, Jr., Charles S. Freer.

At a recent meeting of the Travelers' Protective Association of New York city, a communication was read from the Traders' and Travelers' Union, to the effect that negotiations were being effected with the various transportation companies for increasing the allowance of free sample baggage to 300 pounds, conditioned upon the same being duly registered and released. The Philadelphia and Reading, the Lehigh Valley, and the Philadelphia and Atlantic City Road, already carry the increased amount of baggage, and it is expected that the Baltimore and Ohio and Pennsylvania will soon follow. It was also announced that arrangements were nearly completed with the Traders' and Travelers' Union, by which hotel coupons to the value of \$120 were to be issued in a book, which would be sold to commercial travelers at reduced rates.

The heavy rains of last month seriously interfered with travel in various parts of the country, especially in parts of New England. Quite a number of the jewelers from Attleboro and vicinity had a serious time getting home after the rain, the freshets having so swollen the waterways that the regular boats could not run. Half a dozen or more were caught at New London on Saturday, where they had to remain over night. Next morning they hired a tug to take them to Providence, where they arrived in the afternoon, some of them having been quite sea-sick; from there they were forced to take private conveyances home. The roads were badly cut up, so that they had to take all sorts of cuts across country, and encounter the many perils of the highway. It is said to have cost them some \$25 each before they reached the bosom of their families.

The many friends of R. H. Bullimet, of New Orleans, son-in-law of Mr. H. P. Buckley, and engaged with him in business, will be pained to hear of his death, from apoplexy, which occurred after a few hours of unconsciousness, February 12th. He had many friends among the travelers going to New Orleans. Of genial, frank manners, quick to know his wants, anxious to do all he could in kindness, he will be much missed. His funeral was attended by all the "boys of the road" in the city. He leaves a devoted wife and twins, a bright little boy and girl. Truly, if any sentiment can soften their grief, the appreciation in which he was held by his friends, attesting their friendship by large attendance at his funeral, and the many beautiful floral offerings which covered the casket, among them a crown from a few boys from New York, should leave a bright spot. He was a member of the League.

The most important art sale that has ever taken place in this country is to begin March 3, and continue till between two and three millions of dollars' worth of art goods are disposed of. The sale comprises the collection of Mrs. Mary J. Morgan, the famous collector, whose collection of jewels was recently described in THE CIRCULAR. Included in the collection of paintings, bric-a-brac, statuary, books, and faience, is a large amount of solid gold and silver ware, much of which was made to order from original designs by Tiffany, the Gorham Company, and some English goldsmiths. The entire collection has been on exhibition for several weeks, and has attracted crowds of visitors. Buyers are present from all parts of the Union, and also from several European countries. The catalogue alone makes a volume of over 300 pages, and is regarded of so much importance that an edition *de luxe* is being printed, which will contain many fine engravings of the more important works. The gold and silver ware constitute one of the most attractive features of the exhibition.

After the adjournment of the National Association of Manufacturers and Jobbers a disagreement arose relative to certain action taken by one of the manufacturers, which threatened to lead to serious consequences, but as we go to press, we are in receipt of information from the parties in interest to the effect that the trouble is likely to be immediately settled to the satisfaction of all concerned. We therefore refrain from comments on the subject for the present. It is greatly to be hoped that no rupture may occur in this organization that promises to be of great benefit to the trade in general, and we are confident that if a spirit of concession is manifested by all members, all differences can be satisfactorily adjusted by frank and straightforward methods on a business basis, that will not only tend to promote harmony, but secure to the association the honest and earnest allegiance of every member.

The Gorham Manufacturing Company's Leather Goods Department is attracting much attention in the trade. The articles manufactured in this department are strictly first-class, consisting of pocket books, card cases, letter books, purses, folios, etc., and are marvels of beauty in silver ware and leather combined. The silver trimmings are tasteful in design, and the leather the best and finest that can be procured. Fancy leathers having had their day in this particular line of pocket and hardware goods, the Gorham Company will use only plain or natural leathers, such as crocodile, sea dog, pig skin, English morocco, etc. Bright colors are much sought for, the royal red being the favorite. Dark and sombre colors having had a long run, the bright are hailed with pleasure by ladies of fashion. A novelty in this line is the long and narrow pocket book, which has at once become popular. Mr. W. R. E. Berth is the superintendent of this line of goods, regarding which he is an expert.

During the recent meetings in this city of the National Jobbers' Association, the New York members tendered to their out-of-town brethren a banquet at Delmonico's, in acknowledgement of the similar hospitality extended to them when they visited Chicago, to attend the meeting held there. The menu was prepared in Delmonico's best style, excellent music giving zest to the many courses served. After full justice had been done to the good things provided by the caterer, President Henry Hayes, in the name of the local members, extended a cordial welcome to their guests. Mr. S. H. Hale officiated as toast-master, and ably seconded the President in keeping things moving in a lively manner. Appropriate addresses were made by Mr. Keller, of Pforzheimer, Keller & Co.; Mr. Avery, of the Elgin Watch Company; Mr. Joseph Fahys, Mr. Simon Muhr, Mr. Louis Strasburger, and various other gentlemen. The festivities were continued to a late hour, and were apparently thoroughly enjoyed by all present.

Joseph Dubuque was arrested recently in Newark, N. J., and taken to Troy, N. Y., where he was arraigned in the Court of Oyer and Terminer on indictments charging him with being associated in the robbery of the Marks jewelry store, with Billy Porter, alias O'Brien, and Sheeny Mike, alias Kurtz, who is now in Jacksonville, Fla. The indictment alleges that Dubuque received stolen goods February 2d, 1884, valued at \$30,000, and the property of E. Marks & Son. Dubuque was further charged with burglary in the third degree, in that he entered the jewelry store of Marks & Son. A second count alleged that Dubuque committed grand larceny in the first degree, in stealing diamonds and watches from the store of Marks & Son, valued at \$30,000. Porter was subsequently arraigned on a similar indictment. Both pleaded "Not guilty," and were remanded for trial. Dubuque originally belonged in Troy, but of late years has been associated with the Porter and Sheeny Mike crowd. The hotel he kept at Coeymans was under suspicion a long time. Last summer he kept a restaurant at Coney Island. He has served in the Ohio State prison for robbing a Columbus bank.

We have received the following letter, too late for insertion in our department of communications: "Can you give us any information in relation to the license law (commercial travelers') in Southern States? Is it repealed in any of the States, or does the late decision of the Supreme Court make any change in any of the States? We have an article (patented) not made in any of the Southern States, and would like to introduce it. T. A. W."

[The States that enacted the license laws have *not* repealed them, but the decision of the United States Supreme Court renders them null and void. We would recommend our correspondent to obtain certified copies of the Supreme Court decision, furnish each of his travelers with one, so that if he is arrested or disturbed he will have it to show the Court before which he may be arraigned. These laws have got to be fought by individuals, and every Court in the land will respect the decision of the United States Supreme Court when an attested copy is presented.—ED.]

The Knights of Labor of Newport, Kentucky, recently circulated a letter, reciting substantially that the Dueber Watch Case Manufacturing Company was not treating its employees satisfactorily, and charging them with oppressing capable workmen. In reply to this, the employees of the Dueber Company have prepared and signed an address, which has been printed and sent to the trade, denying in emphatic terms all the allegations made in the circular referred to. They set forth that their treatment has been satisfactory to them, and that they have no grievances whatever. In conclusion, they call upon the trade to disregard the request of the Knights of Labor to boycott the Dueber goods, but to stand by the Company, "as it has stood by us in the past, and, with your moral support, will stand by us in the future." The Knights of Labor seem to have been misled by erroneous statements made to them by a few workmen, who had left the Company before having learned their trade, and who were not entitled to be classified as skilled workmen.

Readers of THE CIRCULAR will miss from this issue the very able articles of Professor Leonard Waldo, Professor in charge of the Yale Observatory, who has been a regular contributor to our pages for some time. A terrible domestic affliction has overtaken him, the distressing nature of which has excited the keenest sympathy in his behalf from all who know the circumstances. In the early part of February he notified us of the serious illness of his wife, which required his constant attendance upon her. She suffered terribly from nervous prostration, and a professional nurse attended her constantly. She suffered much from sleeplessness, but on the morning of February 19 she fell into a sound slumber beside her nurse, who, overcome by incessant watching, also fell asleep. When the latter awoke, after two hours' sleep, she found Mrs. Waldo was missing, and it was then discovered that the poor, distracted woman had risen, partly dressed herself, and left the house by a rear exit. The alarm was at once given, and the neighbors joined in the search for her; the college professors and students joined in the search, and it was finally ascertained that she had been seen wandering in the vicinity of East Rock, and eventually her mangled body was found at five in the afternoon, warm but lifeless, at the foot of the rocks. In her deranged condition she had either fallen over the precipice or thrown herself from the summit of the rocks. It is deemed possible that she may have been frightened by some of the searching parties, and, in her bewilderment, fallen from her perilous position. She was a woman of refinement and culture, about 35 years of age, and a great favorite in college circles and in the social circles of New Haven. Professor Waldo was prostrated with grief at the terrible fate that overtook his beloved wife, and wholly incapacitated for his duties for some time. We can only express to him our heartfelt sympathy in his deep affliction, and we are sure that the many friends he has made through his contributions to our pages will join us in this expression of our sorrow on his behalf.

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Congress and the Bankruptcy Law.

CONGRESS has shown a degree of reluctance to take up the Bankruptcy Bill that is surprising. Seldom has a measure been presented to Congress that has had stronger endorsement from the country at large than has been given to this one. It is a measure having no political significance whatever, but is one that is demanded by the exigencies of trade and commerce, and Congress has been urged to pass it by the commercial organizations of nearly every city in the land, simply because it is a measure calculated to promote commercial and industrial interests, and not for any political, sectional or local reasons. It is a bill intended to promote honesty and square dealing and to prevent fraud, yet, singularly enough, it meets with violent opposition from members from all sections of the country, but mainly from those sections that are composed largely of business men included in the debtor class. The bill known as the "Lowell Bill" has been before the public for two years or more, during which time it has been approved by all the prominent trade organizations, by the press and political economists, and, under their criticism, has been revised and amended until in its present shape it is probably as perfect a measure as can be devised—it is not to be presumed that it is entirely perfect, but, if it has defects, they will be more readily discovered after it has been practically tested than before. At least, the demand for a uniform bankruptcy law is so general, that Congress ought not to hesitate to pass the bill that has received such general and hearty endorsement.

The committee of Congress to which the bill was referred has lis-

tened to arguments *pro* and *con*, and is itself divided as to the wisdom of passing any national bankruptcy bill to take the place of State laws on the subject of insolvency. The question of State rights comes up to frighten members, as it has so frequently done in the past, and makes them reluctant to assume the powers to regulate inter-State commerce that are so clearly conferred upon Congress by the Constitution of the United States. The conditions of trade and commerce are so radically different from what they were when the Constitution was framed, that its provisions should receive the most liberal, rather than the narrowest, construction. The commercial transactions of to-day are of a magnitude that was not dreamed of by the framers of the Constitution, and the traffic of a continent are, by reason of our superior facilities for transportation, communication, etc., carried on as readily as were the transactions of a single State fifty years ago. With these enlarged facilities, and with the immensely extended area of commercial interests, it becomes a matter of prime necessity that the laws governing the credit system should be uniform in all the States, so that a creditor having customers in all sections of the country will understand that the same laws that govern the collection of debts in New York State are the same in Texas, Maine and California, and that an insolvent debtor has no better opportunity for perpetrating fraud in Florida or South Carolina than he has in Massachusetts or Connecticut. So long as the business of the country is mainly conducted on credit, it is of the first importance that the laws governing the collection of debts should be uniform, and that the same legal conditions should prevail where a debt is collectable as prevailed where it was contracted. This is not the case under the diverse State laws now in existence, some of which seem to have been framed for the express purpose of protecting resident debtors from the efforts of their non-resident creditors to collect their honest dues.

There being a divided sentiment in Congress on the subject and also among the members of the committee, this latter body determined to report an emasculated form of the Lowell bill, ostensibly for the purpose of feeling the Congressional pulse, but more likely for the purpose of killing the bill entirely. Many of the more important features of the bill have been so changed in the amended bill of the committee as to destroy the whole force of them, and the prospect is that so many additional amendments will be offered that the whole thing will be thrown aside, even the friends of the measure being unable to vote for it in the shape it is likely to assume. For three or four years the country has had the hope held out to it that the next session of Congress would surely pass a bankruptcy bill, but the appeals of thousands of business men are ignored, and what is in fact a purely business requirement is transformed into a sectional political measure, and its fate thereby sealed. This should serve to convince business men of the fact that if they wish to have their influence felt in matters of legislation, and their individual rights and business interests recognized, they must take a more active part in politics, and thereby insure the election of practical business men to represent them in all legislative bodies, State or

national. It is probably too late to save the bankruptcy bill this session, but if every business man who favors it would let his member of Congress know that he proposes to remember him when the next election comes around, there will be some hope that the next Congress will be more inclined to listen to the demands of trade, commerce and industry, for such legislation as is calculated to protect their interests.

The Conflict Between Labor and Capital.



THE IRREPRESSIBLE and ever present conflict between labor and capital took on proportions during last month that tend to make all thinking men apprehend that this conflict has become one of imminent danger, threatening the business interests of the country in a manner it had never done before. In a recent number of THE CIRCULAR we commented on the strike of the elevated railroad employees, and commended the admirable manner in which the whole negotiations were conducted by the executive committee of the Brotherhood of Locomotive Engineers, the president of which, Mr. Arthur, displayed diplomatic and executive abilities of a high order, maintaining perfect control over the strikers, preventing disorder, and, at the same time, treating with the officers of the elevated railroad companies with a dignity and firmness that commanded the respect of all. Then came the strike of the street car conductors and drivers. Their demand that their compensation should be \$2 a day for 12 hours work was so reasonable as to at once command the sympathy of the entire community, and, notwithstanding the inconvenience arising from the stoppage of the street cars, every one wished the strikers success, and would have submitted to much greater inconvenience, if necessary, for them to gain their point. After a few hours' negotiation, concessions were made on both sides and the differences satisfactorily arranged. But after the cars had been running a day or two under the new agreement, some of the company managers broke faith with the men, and another stoppage of the cars ensued. This difficulty was overcome on all but one of the roads, and, in order to bring this one to terms, a strike was ordered upon every road in the city and several in Brooklyn. As a consequence, for nearly an entire day not a street car was run on any of these roads. The inconvenience of this was felt more by working men and women than by the richer classes, who could afford to patronize the elevated roads. Up to this time the strikers had the sympathy of everyone, but the tying up of all roads because of the obstinacy of one was regarded as unnecessary. The strikers seemed to recognize that they had made a mistake, and were glad to avail themselves of the services of one of the railroad commissioners to arbitrate in the matter, and they finally returned to work on his recommendation without having secured anything that had not been previously offered them by the managers of the road. While this last strike was progressing in New York, the Knights of Labor ordered a strike of several thousand employees on what is known as the Gould system of railroads, the cause being the refusal of the management to discharge some foremen or superintendents who were obnoxious to the men. Simultaneously other important strikes were in progress, but, in the majority of instances, only private interests were involved.

These instances, with others that might be named, show that there is at present a more perfect organization of the labor interests than ever before, and that the association of trade interests in the organization known as the Knights of Labor, has introduced a new and powerful element into the labor question that makes it more difficult to deal with. So far as labor organizations demand only what is right and just they will be sustained by the public, especially when they are antagonized to great corporations that use the power con-

ferred upon them by the people to oppress the people, as is the case with the city railroads, and also with almost every other railroad in the country. In their treatment of their employees, these great corporations have usually regarded the men as so many machines from which the greatest amount of work was to be extracted at the least possible cost, while the general public was not considered as having any rights that the corporation managers were bound to respect. In all contests between labor and these corporations, public sympathy will be with labor so long as its demands are reasonable; but the leaders of the strikers cannot ignore the rights of the general public any more than the corporations themselves can, and if they attempt to push their claims unreasonably, they will lose the moral support of the community which is so essential to their success. They must consider, too, that thousands of their fellow laborers are interested in the success of these corporations, directly or indirectly, and that an unwarranted strike is liable to bring disaster to many innocent persons. The fact that while corporations have been cutting down the wages of labor to starvation rates, the owners, managers and favored ones connected with them have been accumulating colossal fortunes, is proof that their plea of poverty is not pertinent or well founded. The millionaires of the country are mostly railroad magnates, whose colossal fortunes have been amassed at the expense of the public and by methods that are decidedly questionable. But the railroads have become such an important factor in all commercial transactions, that their employees are, in a certain sense, in the service of the public, to which they owe higher allegiance than they do to the corporation that pays them their scanty wages. Hence it follows that if labor engages in a contention with the railroads, which not only suspends transit facilities but creates turmoil in the streets, seriously embarrassing the ordinary operations of business and threatening to provoke open riot, an outrage has been perpetrated upon the people at large which they will, in their own time and in their own way, assuredly resent. While the railroad corporations cannot afford to commit themselves to a selfish policy that works injustice to their employees, the Knights of Labor, if they expect to win and retain popular sympathy, cannot countenance a mode of redressing their grievances that inflicts others of a greater magnitude upon the public.

When the contest between labor and capital occurs in private establishments, a very different phase of the controversy is presented. In all industrial and commercial pursuits the supply is regulated by the demand, and competition plays an important part in fixing prices. Mechanics are generally intelligent enough to understand the commercial value of the goods they are engaged in producing, and are quick to see whether or not they are being compensated fairly from the profits made by their employers. But there are many who will not attempt to look at the matter from the employer's standpoint, considering only their own selfish desires. These argue that their labor ought to be worth so much money, and regard it as the fault of their employers if they cannot afford to pay so much, whereas the employer may be engaged in a severe struggle to keep his goods on the market at all, and competition may be so active that the margin of profit does not afford him even reasonable interest on the capital employed, and nothing whatever for his personal services. Ordinarily the differences between private employers and labor can be adjusted by arbitration, provided both parties to it appear in good faith, prepared to make mutual concessions if necessary, to take into consideration all the factors to the controversy and make the best of the situation as it actually exists. An employer will seldom lose anything by taking his workmen into his confidence and permitting them to see something of the commercial features of the business as well as the purely mechanical requirements of it. One great cause for the unreasonableness of many of the demands of working men is their ignorance of all business methods. They do not realize that the expense of selling goods is often nearly or quite as great as the cost of producing them, and so charge the employer with making very much larger profits than he can possibly

realize. If they could be educated a little better in business methods they would often be more reasonable in their demands.

While labor is perfecting its organization in the manner indicated, it is a satisfaction to see that there is a disposition on the part of the leaders to submit their grievances to arbitration. The parties in interest to a controversy of this nature are usually too intent upon carrying their respective points to give heed to the justice of the case of the other party to the issue; a disinterested outsider hearing both sides is more likely to do justice to all than can those who have money interests at stake. If the Knights of Labor and other organizations of working men will adopt the principle of arbitration as a means of settling their differences with employers, they will have the confidence of the public and gain more in the end than they can by any resort to force, "boycotting" or any other mode of intimidation.

Growth of Art Appreciation.

NOTHING THAT has ever occurred in this country so clearly indicates the growing appreciation of all that is artistic and beautiful than the recent sale by auction of the famous collection of pictures, porcelains, glassware, gold and silver ornaments, bric-a-brac, etc., made by Mrs. Mary J. Morgan during the last few years of her life. For two or three weeks this collection, costing several millions of dollars, was on exhibition at the American Art Gallery, filling its ample rooms in every part. Morning, afternoon and evening the gallery was crowded with art lovers, most of whom came to see and not to purchase, for works of this description are not for the multitude, but for the few, whose purses permit them to indulge their artistic tastes. But the multitude could see, admire and appreciate quite as well as their more wealthy neighbors, and were not inclined to permit this rare, if not unique, collection to be dispersed to the four quarters of the globe without feasting their eyes upon it. Considered simply as an art exhibition, it was one of the most successful that ever occurred in New York, being crowded with visitors at all hours, and affording all full satisfaction for the time given to it. Not the least attractive part of the collection was the beautiful examples of the gold and silversmiths' art which Mrs. Morgan had accumulated in this country and Europe. Of the larger specimens, mostly intended for table ornaments, the greater portion were made in this country, mainly by Tiffany and the Gorham Manufacturing Company. These elaborate and beautiful articles were mostly made to order, from special designs prepared by the manufacturers and approved by Mrs. Morgan before work was begun upon them. One point was clearly demonstrated by this exhibition of gold and silver ware, and that was that our American artists and workmen have nothing to fear when the products of their genius and skill are brought in critical competition with the works of European artists. There were gathered at this display examples of pretty much everything that a person of the most extravagant taste could think of to place upon a dinner table, either for practical service or mere ornamentation; and there was the greatest profusion of every thing, fanciful knives and forks in numerous patterns in quantities; spoons by the score; fish knives in elaborate designs and rich in ornamentation; beautifully decorated vases, berry and fruit dishes in artistic designs and showing the highest degree of skilled workmanship; candelabra of varied patterns; some massive and rich, while others were light and delicate as frost work on glass. Then there were dishes of almost every variety, showing beautiful combinations of the various precious metals, not unfrequently associated with glass of different colors. There were silver candelabra standing fully six feet high, with many branching arms to hold wax candles. It is impossible to enumerate one-quarter the beautiful examples of metal work this eccentric lady had accumulated, but it will probably be a

great many years before another such a collection will be gathered under one roof. While the pictures and porcelains formed the larger and more costly portion of the collection, we doubt if they excited more genuine admiration than did the collection of gold and silver ware—certainly the cases containing the latter were constantly surrounded by such throngs that one had to struggle long and seriously to get a sight of the many articles.

The sale of pictures occurred first, and buyers were present from nearly every State in the union, and many of the most valuable paintings were secured by residents of other cities, much to the chagrin of those artistic gentlemen who so frequently proclaim that New York is the art center of the continent. It had been asserted that Mrs. Morgan did not make her purchases with intelligence and discrimination, but the sale demonstrated that this was an error, for those pictures for which she had paid sums declared to be excessive, sold under the hammer for an advance over what she had paid. The same was true of the finest examples of porcelain, bric-a-brac, etc., the prices realized on the entire sale being largely above what had been anticipated. One picture by Breton, for instance, selling for \$45,500, or twice as much as Mrs. Morgan paid for it, while a little porcelain vase, of the kind known as "peach blow" glaze, made in the 17th century, which cost Mrs. Morgan \$15,000, sold to a Baltimore gentleman for \$18,000. This vase is but eight inches in height and three inches in diameter, but it is unique, there not being another like it in the world, and the art of producing this particular glaze having been lost. When such prices as these are realized for such luxurious works of art, it cannot be said that Americans do not appreciate art, or that they are not discriminating judges of it.

This sale showed conclusively that the love of art in this country is not confined to any particular section nor exclusively to persons of great wealth; but on the contrary, that it pervades the entire community, and is extending rapidly. It also shows that nothing possessing real artistic merit is too good or too costly for our people. It will be remembered that Mrs. Morgan had, in addition to the collection here referred to, a collection of diamonds and other gems, costing over a million of dollars, which were sold at private sale, and which were noticed in these columns a few months since. Taken altogether, Mrs. Morgan's art and jewel collection had not its equal in the world, either in private hands or in public museums. She is said to have expended about \$4,000,000 upon it. It is unfortunate that it is scattered, but the specimens will probably do more separately to stimulate appreciation of art than they would in a single collection.

The sale of the silverware attracted great crowds and the bidding was lively. Tiffany was an active bidder on articles that had been made by his house for Mrs. Morgan, and quite a number of pieces were struck off to him. Good prices were realized for the more choice articles, but in the aggregate the elegant examples of skill and workmanship brought but about fifty per cent. of their original cost. In another column we give a list of the principal articles and the prices at which they were sold.

[Reprinted from the Mineral Statistics of the United States for 1883-1884. Edited by Mr. Albert Williams, Jr. Published by the Geological Survey.]

Precious Stones.

BY GEORGE F. KUNZ.

Continued from page 42.



THE SO-CALLED Thetis hairstone described by Dr. Jackson*, found at Cumberland, Rhode Island, is really a quartz cat's-eye, and some very fair cat's-eyes have recently been cut from it by Mr. Edwin Passmore, one of them nearly two-thirds of an inch long, and quite equal to many from Hoff, Bavaria.

* "Geology of Rhode Island," 1839.

Little or no novaculite has been used during the last year for ornamental purposes, although it has some use as streakstones for mineralogical work, being better adapted for this purpose than anything else, owing to its hardness and pure white background.

Red jasper is found on Sugar Loaf mountain, Maine, and a fine yellow with chalcedony has been found at Chester, Massachusetts; fine red and yellow, also by Dr. Horton, 4 miles east of Warwick, at Bellevale, Orange county, New York; pebbles of fine red occur along the Hudson river from Troy to New York, especially at Hoboken, Fort Lee and Troy, where the jaspery rock crops out. The so-called green jasper of Norman's Kill from the Hudson river slates was used by the Indians for arrow points.

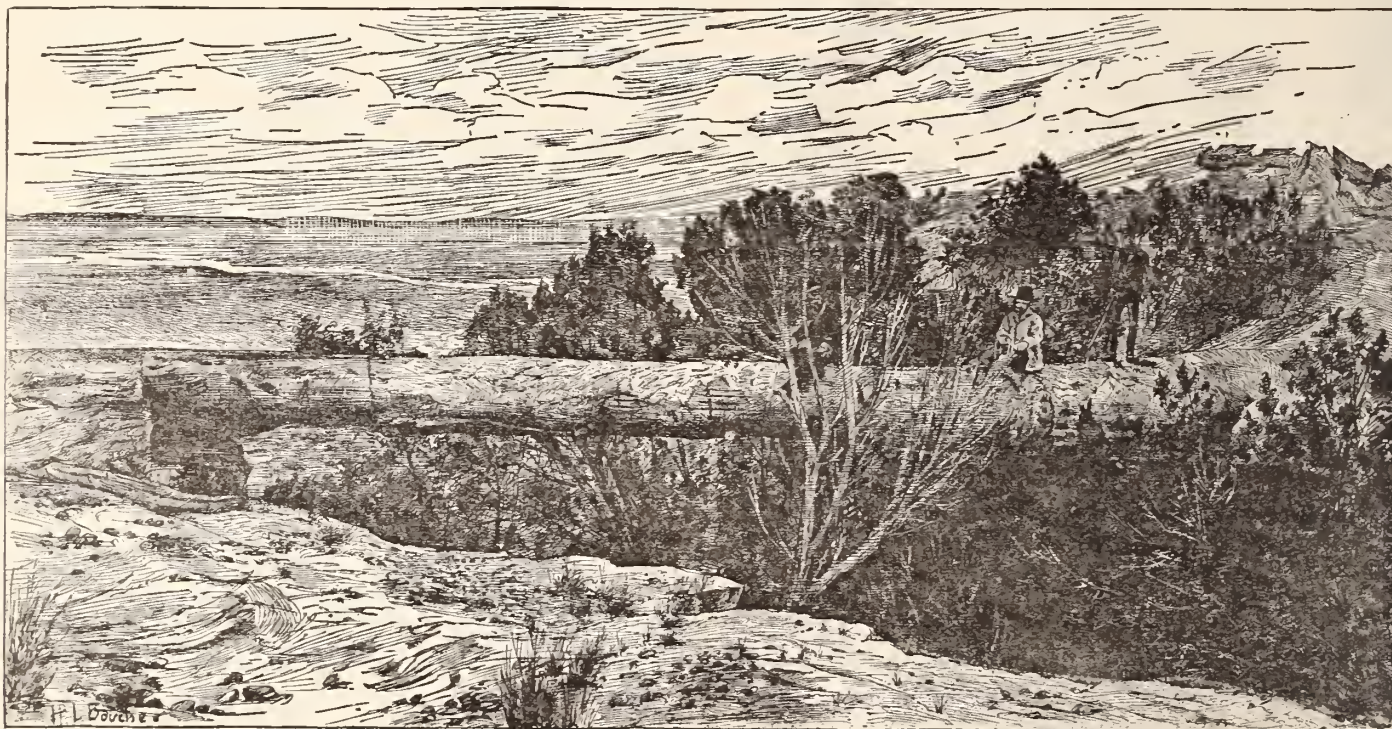
Jasper agate is found in considerable quantity at Diamond Hill, Cumberland, Rhode Island, in all shades of white, yellow, red and green; these colors are also all intermixed in one specimen, usually mottled, and at times beautifully banded in irregular seams, white, creamy brown, greenish and brecciated. It is found in large quantities, and although fully 1,000 pounds is taken away every year by visitors and collectors, not over \$100 worth is sold or polished per annum.

The moss jasper of Trego county, Kansas, is equal to any yet found.

Fine yellow, brown and red jasper is found at the Los Pinos agency; throughout the Middle and South parks; along the Gunnison, in the Dakota group; on the Arkansas, Grand, White, Animas and other rivers of Colorado, in the drift and in some of the trachytes, mostly red, green and brown. A very fine specimen was found at the junction of Lost Trail creek and the Rio Grande. Small but smoothly worn pebbles of jasper and agate are quite plenty on the shores of Lake Tahoe, California. Red and green jasper are very abundant in the neighborhood of San Francisco, though not of fine quality; some of this stone has been used in building and for sidewalks.

Fine red jasper is found on the Little Colorado river, New Mexico, and also on the Willamette, Oregon. The latter region evidently furnished the material for the fine arrow points of Oregon.

The banded jasper found near Colyer, Graham county, Kansas, red, yellow and other colors, with even white bands, affords blocks over 1 foot long and 6 to 8 inches wide, and really merits the atten-



NATURAL BRIDGE OF JASPERIZED WOOD AT CHALCEDONY PARK, APACHE CO., ARIZONA.

Large pieces of fine yellow jasper have been found at Tyringham, Massachusetts, by Mr. Daniel Clark, of that place.

In Pennsylvania† jaspers more or less impure are abundant in the drift of the Delaware and Schuylkill rivers; also in Berks county, near Reading. Brownish-yellow is found at West Goshen, Chester county, and a reddish-brown variety near Texas, Lancaster county, and a brown-banded variety at the hydropathic establishment near Bethlehem. The arrow heads found in this vicinity and near Easton are mostly made of jasper. The jaspery sandstone so plenty near Mauch Chunk might be utilized for large ornamental work with advantage.

In North Carolina fine jasper, banded red and black, is found in Granville, Person county; bright brick-red and yellow at Knapp's, Reed's Creek, Madison county; at Warm Springs; at Shut-in Creek in Moore county; also in Wake county, and elsewhere in the State.

In Texas fine jasper has been found near Fort Davis, Bexar county, and at Barilla Springs, where are found the jaspery agates called Texas agate.

tion of workers in ornamental stone, as it is unrivalled in the world for banded jasper.

Bloodstones in beautiful specimens with the red markings very fine are found at Chatham county, Georgia. Some fine heliotropes from here are in the cabinet of W. W. Jefferis. Heliotrope was formerly found in veins in slate at Blooming Grove, Orange county, New York. Some very fine pieces have been found near the Willamette river, Oregon, and of fine quality near the South park, Colorado, and below the Uncompahgre, near Grand river.

Basanite was found by Dr. Horton‡ at Canterbury and Cornwall, New York. It is also sparingly found in nearly all the drift north of New York City, and in that of the Delaware river from Easton, Pennsylvania, down to the State line.

Gold quartz.—The gold found in California quartz is worth about \$16.50 per ounce, but jewelers will give willingly from \$20 to \$30 for each ounce of gold contained in such material as they can use. The price of specimens varies according to their beauty from \$3 to \$40 per ounce of quartz. The specific gravity of the mineral is

† "Preliminary report on the Mineralogy of Pennsylvania," page 60.

‡ "Geological Survey of New York," 1840.

taken, after which the gold value is ascertained by a table called Price's table. The amount of this material in the rough sold for jewelers' purposes is variously estimated at from \$40,000 to \$50,000 per annum, \$1,000 to \$2,000 worth being often purchased at one time. One lapidary at Oakland, who employs several assistants, purchased nearly \$10,000 worth within one year, and a large jewelry firm in San Francisco, during the same time, purchased nearly \$15,000 worth of this material.

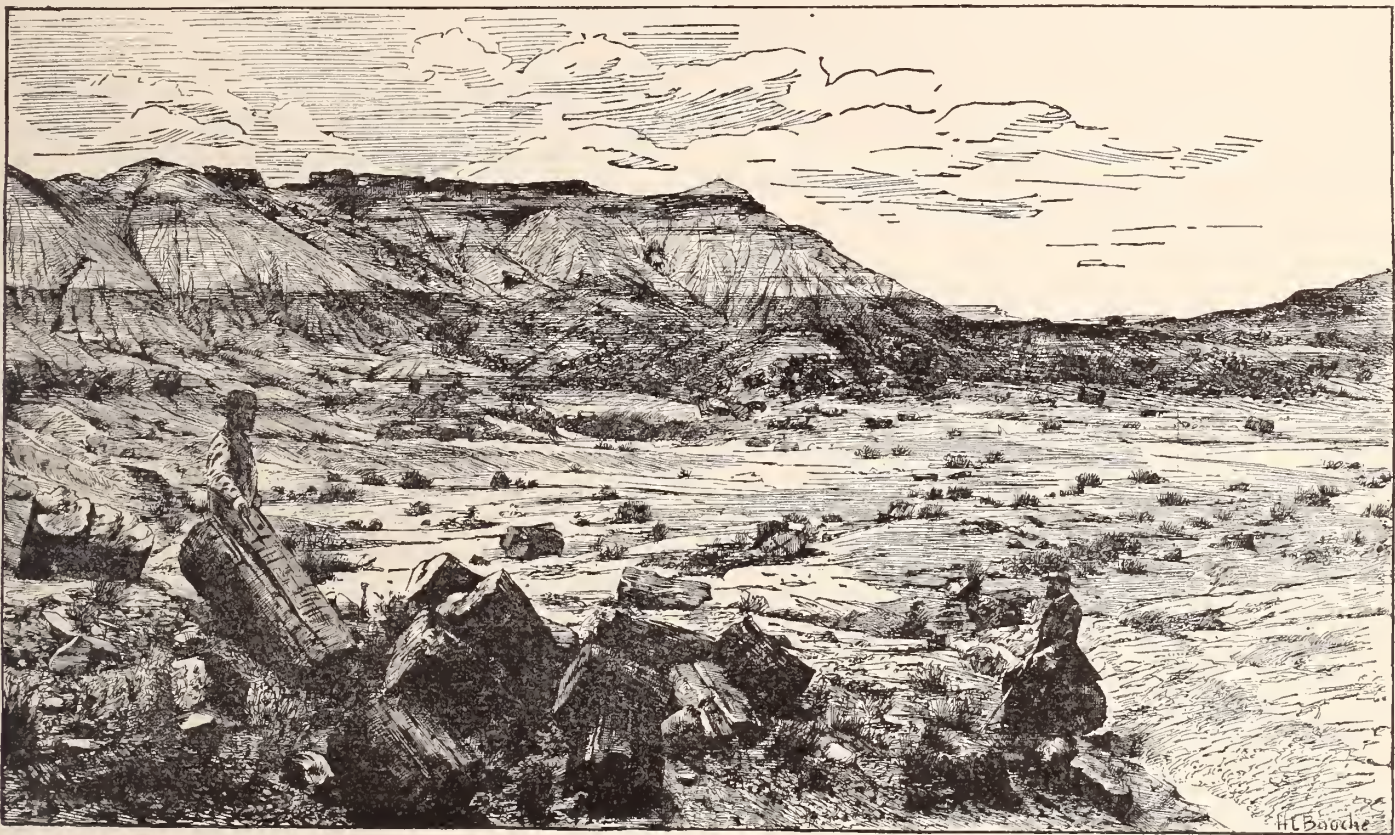
Great care must be taken in the selection of the quartz. The stone used must be large enough to bear the rough treatment of the diamond saw and the lap wheel of the polisher; all of the ore is friable and some of it crumbles to pieces while undergoing these processes. For the same reason all the pieces set in cabinet work are small; the hanging of the saw in the gold in the slitting prevents the cutting of large pieces, as the wafer-like slabs are apt to be broken by this resistance while being separated from the block. Pieces 4 by 2 inches are quite rare, although fine pieces 4 inches square are at times seen.

the mountings very modest, but the demand has created a supply of the most elaborate designs, and at present it is used in every conceivable form of jewelry, and in articles of personal or house adornment of almost unlimited variety, such as canes, paper weights, writing cases, perfume bottles, fan sticks, bracelets, watch chains and lace pins, the latter in such designs as shovels, picks and other mining emblems.

In certain kinds of furniture it is used as paneling; and here, as in the jewelry, the effect is better brought out by added colors, such as are afforded by agate, moss agate, silver rock, smoky quartz, pyrite, chalcopyrite, cinnabar, malachite, turquoise in the matrix and other bright minerals.

Much of the jewelry made of this material is sold to tourists from the eastern States and from other countries. Eleven hundred dollars' worth was recently purchased by an Asiatic embassy, and scarcely any one visiting California fails to purchase a memento. The sale is increasing.

The best taste, as a rule, is not exercised in the designs. Many



VIEW OF CHALCEDONY PARK, APACHE CO., A. T. (See Last Issue).

Rarely more than one-half of the ore purchased finds its way into the mounting, owing to this breakage and the trimming into shape. Nearly all the cutting of this material is done at Oakland, California.

The white gold quartz of California is mainly supplied from the following counties: Butte, Calaveras, El Dorado, Mariposa, Nevada, Placer, Sierra, Tuolumne and Yuba.

The black gold quartz, a quite recent novelty, is found at the Sheep Ranch mine, Calaveras county, and at Sutter creek, Amador county, California.

The so-called rose gold quartz is made by backing a translucent quartz with the desired shade of carmine paste, and forms an effective contrast to the opaque white and black gold quartz with which it is usually mounted in some design.

Single stones for scarf pins, rings and sets of pin and ear rings, sell from \$2 to \$10 each, and occasionally exceptionally fine or curious pieces bring higher prices.

It is not many years since gold quartz has been utilized to any great extent in jewelry. At first the designs were usually simple and

are too large and ungainly for personal adornment, and many others are not as well mounted as most of the other jewelry sold with them. Perhaps not one article in ten sold will have much if any wear. There is much room for improvement in the line of this work.

One of the large designs made of gold quartz, representing the cathedral of Notre Dame, at Paris, is valued at \$20,000. It stands about 12 inches high, and is perhaps the finest piece of gold quartz work produced.

A mass of gold quartz weighing 160 pounds was hydraulicked out of the bank of the Nevada Hydraulic Company at Gibsonville. The boulder was smoothly washed and had the appearance of having been ground in a pothole. Its estimated value was \$2,500, but its real worth was more, since it was valuable for lapidaries' purposes.

It is stated that some years since a Mr. Thiery devised a method of fusing quartz and throwing in lumps of heavily alloyed gold and allowing the material to cool in molds of required shapes. It is said

the mingling of the metal and the quartz was complete, but the quartz had a milky, unnatural, glasslike appearance entirely unlike the gold quartz it was intended to represent. Messrs. LeDuc, Connor & Laine, on applying for a patent for an imitation gold quartz produced by means of electricity, found that a similar patent had been issued nearly fifty years ago to a New York man. However, notwithstanding they were not able to obtain the monopoly, they started as manufacturers of jewelers' quartz, but abandoned it as it proved so unsatisfactory.

Actinolite.—The emerald-green glassy actinolite of Concord township, Pennsylvania, is very fine and might be utilized in some form, possibly the compact, as a form of cat's-eye. An inlaid ornament of this mineral taken from an old piece of furniture in London during the early cat's-eye excitement netted the persons who cut it up hundreds of dollars.

Rutile.—The rutile of Middletown, Connecticut, was cut into gems that were almost ruby in color, as early as 1836, by Prof. C. U. Shepard.

The finest small brilliant geniculated crystals are found at Mill-holland's Mills, White Plains, at John Lackey's farm, near Liberty Church, and at Wilson's, near Poplar Springs, in Alexander county, North Carolina. These have furnished some of the finest cut black rutile which more closely approaches the black diamond in appearance than any other known gem. Some of the lighter colored ones furnished gems closely resembling common garnet.

Beautiful long crystals, at times transparent red, have been found ranging in thickness from that of a hair to one-quarter, and in some few cases, nearly two-thirds of an inch across, and from 1 to 6 inches in length, at Taylorsville and vicinity, and at Stony Point, North Carolina. These are very brilliant and at times doubly terminated.

Beautiful crystals are also found in quartz and loose in the soil at Sadsbury township, Pennsylvania, for 7 miles along the valley, especially near Parksburg, where double geniculations and geniculations forming complete circles are found, weighing over 1 pound. This is the "money stone," so called by the inhabitants of the district, as it is often looked for because they can obtain money for it from the collectors; some of the finer small ones are worn as ornaments.

Some of the beautiful geniculated nigrine from Magnet cove would also well serve the purpose of ornament. These and the Alexander county rutiles are possibly the finest in the world.

Axinite has been observed with the essonite and idocrase at Phippsburg and Wales, Maine, and also at Cold Spring, New York. The best American locality is the one near Bethlehem, Pennsylvania, first found by Prof. F. Prime, Jr., and Dr. Reopper, and described by Prof. B. W. Frazier. These crystals, colorless, pale yellowish and brown, are at times one-fourth inch long, and future finds in this vicinity may bring some gems to light; up to this time no stones suitable for fine cutting have been found, though a few might furnish mineralogical gems.

Jade.—Among the implements collected by the Point Barrow (Alaska) Expedition, were a number made of dark green jade. This mineral is supposed to be found in a place somewhere to the east of Point Barrow.

Rhodonite.—Rhodonite has been found in an extensive bed at Blue Hill bay, Maine, on Osgood's farm; also in boulders at Cummington, Massachusetts, and in the neighboring towns; at Warwick, Massachusetts; in Irasburgh and Coventry, Vermont; near Winchester and Hinsdale, New Hampshire; and at Cumberland, Rhode Island.

The Alice mine, at Butte City, Montana, has produced a large quantity of rhodonite associated with rhodocrosite, and it has here been used to some extent as a gem stone.

It has recently been described by Mr. William North Rice[¶] as

occurring at the White Rocks, Middletown, Connecticut—only in a limited quantity, however.

The variety fowlerite, found at Franklin, Hamburg and Sterling, New Jersey, is also very fine in color.

Rhodonite has recently been used very effectively in combination with unpolished or stone-finished silver, as handles for very fine ornaments, the rose color streaked with black presenting a very pleasing contrast.

Epidote.—Fine crystals of epidote have been found at Haddam, Connecticut, which might yield small gems. The large crystals in quartz, at Warren, New Hampshire, were all too opaque, though fine as cabinet specimens.

At Roseville, in Byram township, Sussex county, New Jersey, epidote was formerly found in good crystals that would afford mineralogical gems.

Dr. F. A. Genth* mentions a crystal of epidote in the cabinet of the University of Pennsylvania, from the gold washings of Rutherford county, North Carolina. This crystal is strongly pleochroic, like the so-called puschkinite from the auriferous sands of Katherinenburg, in the Ural mountains, and would cut the best American gem yet found.

Some fine highly complex forms have been observed at Hampton's, Yancey county, North Carolina, by Mr. William Earl Hidden.† The Yancey county crystals would also possibly afford cabinet gems, none of them as fine, however, as the Tyrolese epidote.

In Chester county, Pennsylvania, crystals 3 inches in length have been found. The principal localities are the Smith and McMullin farms, West Bradford township; East Bradford, where dark green specimens occur, and Taylor's mill, West Goshen. In East Marlboro' township it occurs in yellowish-green crystals, and at McCloud's farm and Pearce's old mill, Kennett township. In the limestone quarries of London Grove and Sadsbury townships it occurs in bottle-green crystals.

Idocrase.—Idocrase or vesuvianite that would yield small gems has been found at Phippsburg, Maine ‡ A beautiful wine-colored variety§ is mentioned as occurring near New Hope, Bucks county, Pennsylvania.

At the locality 1½ miles from Sanford, Maine, idocrase occurs in unlimited quantities, one ledge being fully 30 feet wide, made up almost entirely of this mineral, associated with quartz and occasionally with calcite. Some of the crystals are 7 inches long, and the smaller ones would afford fair gems at times.

Idocrase is mentioned by Endlich as occurring in large crystals on Mount Italia, Colorado, and north of the Arkansas river, in granite.

Cassiterite.—The finer crystals of cassiterite found at Hebron, Norway, and Paris, Maine, would afford mineralogical gems.

The claims in the Temescal range, in San Bernardino county, as well as the locality near San Diego, California, will possibly produce specimens of this mineral equal to that from Durango, Mexico.

The important occurrence at the Broad Arrow mines, 2 miles from Ashland, Clay county, Alabama, may produce both the crystals and the stream tin. The Black Hills of Dakota locality is a fine one for the gem. On Jordan creek, Owyhee county, Idaho, Prof. W. P. Blake mentions very fine specimens of wood tin one-eighth to one-half inch across, of very pure and clean material. Cassiterite has also been found in large quantities in North Carolina, though scarcely one of these localities has produced a single fine gem.

(To be Continued.)

* "Minerals and Mineral Localities of North Carolina," 1881, page 44.

† *Ibid.*, page 86.

‡ Cabinet of Gideon Bearce, West Minot, Maine.

§ George Rogers: "Geological Report of Pennsylvania," Vol. II., page 685.

¶ *American Journal of Science*, December, 1882.

¶ *Science*, Vol. I., No. 21, page 601.

Recipes for Working Gold.

TO MELT GOLD.



FREPARE a good fire and heat the ingot in which you wish to cast the gold a little hotter than boiling water; next put the alloy into the crucible, and add a small quantity of pulverized borax, and leave on the fire until melted. Cast this into a clean ingot, and, after breaking the bar into small fragments, return to the pot and re-melt the gold, not adding borax this time, but when the gold looks clear and smooth on the top, add, for every 6 ounces of gold, a piece of saltpeter about the size of a pea, and in about a minute pour the gold. Keep up the heat after adding the saltpeter. If the stock was clean when you commenced, the gold will roll well.

Much depends on the first rolling of the stock; 18 karat should be subjected to a very heavy strain the first and second draughts, which imparts a grain to the stock; light draughts stretch the gold on the surface, and the middle portion, remaining as a core, causes the gold to crack, many good bars having been condemned, while the trouble was in the rolling. After the 18 karat has been rolled to about twice its length it must be annealed, then rolled to the size you require.

Proceed with melting 14 karat as above described for 18 karat, giving it as heavy strains in the rolls, but not rolling so much before annealing as the 18 karat. The other karats of cheaper grade do not require the use of saltpeter to toughen; instead of which, use a little sal ammoniac and then proceed as above.

When it is desired to produce a very tough gold, use as a flux a tablespoonful of charcoal and one of sal ammoniac, adding it to the gold on the eve of melting; the sal ammoniac burns away while toughening the gold, leaving the charcoal behind to form a layer upon its surface in the crucible to protect it from the action of the air, which would refine the gold by destroying some of the alloy. When perfectly fused, the mixture must be well stirred with an iron stirrer (consisting of a long round piece of iron sharpened at the point), which should previously be made red hot, to render the whole mass uniform in quality. The employment of the mixture of sal ammoniac will bring the ingots of gold up bright and clear; it will also prevent them from splitting or cracking at the rolling mill and in subsequent working; if proper attention has been paid to it, the gold will then be found tough and pliable.

We will sometimes find common salt recommended as a fluxing agent for producing tough gold; we cannot concur in this opinion, however, as it is not half as clean as sal ammoniac, and besides this, it makes a liquid flux, and unless great care is exercised, it runs with the metal into the ingot mold, producing a brittle-like substance, which forces its way into the bar of gold, the surface of which becomes irregular and full of holes; on this account alone the use of salt is objectionable for preparing clean and smooth bars.

This is also true of borax, which is still extensively employed by the goldsmith for melting purposes. It will be found, however, by the practical man, who has ever employed sal ammoniac and charcoal, that it is the best flux he can use, and is unsurpassable for imparting toughness, cleanliness and good workable qualities to gold.

Melt new alloys in every case twice; treat solders the same way, to insure a thorough incorporation of the copper with the gold.

CORRECTING BRITTLE GOLD.—As soon as a gold ingot shows sufficient ductility to withstand the first two or three annealings without breaking, and if by the effect of this first test it gives indications of brittleness, by the appearance of cracks and fissures upon its surface, recourse must be had to a sort of mold casting, what the French call "brassage." This operation is easily performed. It consists in taking a soldering coal sufficiently large to receive the ingot, preparing it thus with a file that a deepened half-round hollow is worked in. The ingot is now heated upon a coal to nearly white heat, and in this condition it is laid upon the prepared coal, and

covered with borax at all points to facilitate the melting, which is about to be undertaken, the thus prepared ingot is exposed to the influence of a heavy wick of the soldering lamp, and by aid of a somewhat long blowpipe the flame is directed upon one end; the fire is maintained until the surface begins to melt, whereby all cracks disappear, without raising the temperature sufficiently, however, to either shorten the ingot or separate it into several parts. The requisite degree of heat will be recognized as soon as the bar begins to give way, and begins to conform to the smallest angles of the coal, as well as by the rainbow hues which begin to appear upon its surface, and finally, by the union of the cracks, which disappear in proportion as the angles of the bar conform to the angles of the coal, under the heat of the flame. When the ingot has reached this degree of heat in its entire extent, the operator may be assured of its malleability.

When annealing red gold, do not quench it when red hot, but allow the gold to blacken before quenching, otherwise it will slit or seam.

Experiment has shown that plumbago crucibles are the best for all practical purposes of melting, and with care they will last from twenty to fifty times; if new, a very small quantity of charcoal powder should be put into the pot with the mixture of alloy. This coats its surface, and prevents the metal from adhering to it. When the gold is at the point of fusion, fling on to it about a tablespoonful of pure and perfectly fine vegetable charcoal. The layer of charcoal which forms upon the surface of the gold in the crucible protects the mixture from the action of the air.

TO PART GOLD FROM OTHER METAL.

There are two principal methods of gold parting, termed the wet and dry. The wet methods are the sulphuric and nitric acid processes. The chlorine, cementation, litharge and sulphur are dry processes. In the wet process there should be two or three parts of silver to one of gold. The metals can be alloyed by fusing in a plumbago crucible. The melted alloy is poured into cold water to obtain the alloy in a flaky condition, so that it can be readily acted on by the acids.

In the sulphuric acid process the alloy is boiled with two or three times its weight of acid in a cast iron vessel. After the gold has subsided, the sulphates of silver and copper are decanted. Repeat the process, wash the gold and boil again with acid. The gold is obtained in the solid form by washing, drying, melting and casting into bars or ingots. The silver is collected on copper plates or turnings introduced into the solution, and bar silver is obtained by washing, drying, melting and casting.

In the nitric acid process, a platinum vessel fitted with a lid, from which issues a stoneware pipe for condensing and collecting nitric oxide and nitrous anhydride, which are given off from the decomposition of the acid by the copper and silver respectively. The granulated alloy is introduced into the platinum digester with nearly twice as much acid. The lid is luted on and the digester is heated on a sand bath. When the violent action has ceased, the digester is cooled and the liquid decanted. The residue of gold is treated with acid and the last operation repeated. The residue of gold is obtained in the solid form, as in the sulphuric acid process.

In the chlorine process the gold is melted in a clay crucible fitted with a lid, in which is an opening for the introduction of a clay pipe, by which the chlorine generated by any of the usual processes is conveyed to the bottom of the melted mass, while the surface of the gold is covered with a layer of borax. The chlorine is absorbed by the metals that may be associated with the gold, converting them into chlorides, which are generally volatilized, except the silver, which remains fused as argentic chloride. As soon as orange-colored vapors appear the current of chlorine is stopped, for the chlorine attacks the baser metals first. The crucible is taken from the fire, and after ten minutes the gold sets and the argentic chloride is poured off. The gold is melted and cast into bars.

The litharge and sulphur process is employed merely for concentrating the gold in a smaller quantity of silver.

Gold from gilt metal.—Take a solution or borax water, apply to the gilt surface and sprinkle over it some finely pulverized sulphur; make the article red hot and quench it in water; then scrape off the gold and recover it by means of lead.

Gold from old watch plates.—Take equal quantities of saltpeter and borax and dissolve in a small quantity of water. Next, red heat the gilt pieces and plunge them into this solution. By repeating this several times, the gold will loosen and precipitate in the fluid.

Gold from silver gilt.—Gold is taken from the surface of silver by spreading over it a paste made of powdered sal ammoniac with aquafortis, and heating it till the matter smokes and is nearly dry, when the gold may be separated by rubbing it with a scratch brush.

When gold and silver form an alloy, this is to be melted and poured from a height into a vessel of cold water, either pouring through a broom or by imparting a rotary motion to the vessel. By this means the alloy is reduced to a finely granular condition. The metallic substance is then treated with nitric acid and gently heated. Nitrate of silver is produced, which can be reduced by any of the ordinary methods; while metallic gold remains as a black mud, which must be washed and melted.

Gold and silver from lace.—Cut into pieces the gold or silver lace, tie it tightly and boil in soap lye till the size appears diminished; take the cloth out of the liquid, and, after repeated rinsings in cold water, beat it with a mallet to draw out the alkali. Open the bundle, and the pure metal will be found in all its beauty.

Or previously boil the lace or other textile for a short time with pure wood lye or a solution of potash, intensified with calcined lime. When all the gold or silver spun silk threads are dissolved wash the remaining metals several times with clean water and collect upon a filter of blotting paper.

Gold from gold sediments.—Gold may be reduced from sediments by two processes, melting and dissolving. For melting, the sediment must be washed several times; it is next dried, and to 1 part of the sediment add 2 parts litharge, $\frac{1}{8}$ part borax, 2 parts potash and $\frac{1}{2}$ part salt; mix it thoroughly and let it melt well in a strong fire. When fluid, it must be well stirred with an iron rod. A lead mass will be found at the bottom upon cooling. Bring this upon the cupel and drive off; the residue will be silver and gold, which part.

Sediment for dissolving must also be well washed; red heat it, wash again and dry. Then pour strong nitro-muriatic acid (2 parts nitric and 3 parts muriatic acid) over it and let it stand for one hour; replace it by fresh for another hour. These two applications will be sufficient to dissolve all the gold contained in the mass. Next dilute the acid and precipitate the gold. By this treatment any silver contained in the sediment is lost, the nitro-muriatic acid forms chloride of silver, which mixes with the sediment and cannot be saved, being indissoluble in this acid and water. I prefer melting, for the reduction of the gold, to dissolving. I have found that by the latter way I always lost; at least I never had as much as when I melted it. The loss of the silver is sometimes quite significant.

Tin from gold.—Much depends upon the treatment the tin received in soldering. If it received too much heat, it has penetrated into the gold and can never be expelled again. This is known when scratching the tin; if it is glass hard, it has become incorporated. If, however, it is still soft, scrape it off as closely as possible, and lay the article in a dilute mixture of sulphuric acid and water, and leave it immersed for a few hours. Have a care to have the fluid only strong enough to dissolve the tin, but not to attack the gold. When, after taking out, it should still show black spots, which is a sign that more tin is present, scrape and immerse again.

Cleaning mat gold articles.—For cleaning mat gold articles that have become blackened by exposure, I would recommend a solution of 60 grams (1 oz., 18 dwts., 13.9 grains) carbonate of soda, 30 grams

(19 dwts., 7 grains) chloride of lime, 15 grams (9 dwts., 15½ grains) table salt, and 1 pint water. This is perhaps the best recipe for restoring the luster either of bright or mat gold.

Another recipe gives different proportions: 80 grams (2 oz., 11 dwts., 10.6 grains) chloride of lime, 80 grams bicarbonate of soda and 20 grams (12 dwts., 20.6 grains) table salt; dissolve these ingredients in 3 liters (3¾ quarts) distilled water. For cleaning an article, lay it into a porcelain dish, cover it with the fluid, and, if difficult to clean, heat the latter; next rinse in alcohol and dry in sawdust. The fluid used is no longer good. Store the remainder for use in glass bottles.

Metal lap finish.—Country watchmakers are sometimes called on to do odd jobs; to these pertain, perhaps, the making of a plain gold band ring, and in the absence of the proper tools it is puzzling to them how to finish and polish such a ring so as to retain the square edges, known as the "metal lap finish," and how the laps are charged with the polishing materials, etc. To such we would say that a metal lap can be bought of any material dealer. Charge the lap with fine emery, number one. Rub it in by using a perfectly flat piece of hardened steel; lay the lap on a bench or table while charging it. After you have rubbed in a sufficient quantity of emery put the lap to the lathe and polish about one or two inches of it nearest the edge, by holding a flat piece of stone, such as agate or flint. Put the stone on a stick with cement and bear on the lap very hard until you have polished it. You cut the gold with the unpolished part and finish it with the polished part.

To restore gold after hard soldering.—Gold, after hard soldering, has become black and unsightly, and its color must be restored or improved. First, heat it to a dull red, and then plunge it into a liquid composed of one part sulphuric acid and three parts water; take out after short time, or when it looks clean, and rinse in clean water; use scratch brush, and the following recipe will be found to be excellent: Sulphate of copper, 2 dwts.; French verdigris, 4 dwts., 12 grains; sal ammoniac, 4 dwts.; nitrate of potassa, 4 dwts.; acetic acid, 1 oz. First reduce the sulphate of copper to powder; then add the others and powder also; last, the acid—stir well. Suspend the article on copper wire and dip into the mixture; hold it over a clear fire until it turns black; dip it while hot again in the mixture; rinse in water or repeat it if necessary. This will color any quality of gold.

To heighten the color of gold.—Place 4 oz. of saltpeter, 2 oz. of common salt and 2 oz. of alum in a crucible. Add sufficient water to cover the mixed salts. Now, place the crucible on the fire and allow the mixture to boil. When this takes place, place the article to be colored in the mixture, taking care that it is suspended by a hair. It may be left in the crucible for about 15 minutes, when it should be withdrawn, well brushed with a fine scratch brush, and re-dipped if the color is not intense enough. For small gold articles, such as a keeper, a plain ring, etc., a very good plan is to place them on a lump of charcoal and make them red hot under the blowpipe flame, and then to throw them into a pickle composed of about 35 drops of strong sulphuric acid to the ounce of water, allowing the articles to remain therein until the color is sufficiently enhanced. Washing the article in warm water, in which a little potash has been dissolved, using a brush, and finally rinsing and drying in boxwood sawdust completes the operation.

Alloying gold.—In preparing the proportions of gold, silver and copper for the crucible, care should be taken in weighing each metal accurately, in order to prevent either improvement or deterioration in the qualities of the gold constantly in use. In melting all qualities, it is a wise plan to place the lightest of the metals to be melted at the bottom of the crucible, viz: the copper first, the silver next, and the gold last; by so doing the melter is more likely to get a perfect commingling of the metals, as the gold, being the heaviest, is sure to find its way to the bottom of the pot. When spelter is employed, it must not be put in until the other metals are melted;

being of so volatile a nature, it would all be evaporated before the mixture of alloy was properly incorporated, consequently the bar of gold would fall short of its original weight, the quality would be improved, and the manufacturer would be unable to compensate himself without re-melting with an addition of alloy. In case spelter is used, therefore, it is best to melt the other metals, and when thoroughly fluid, to add the proportion of spelter; when melted, let the whole stand for a moment in a bright button, stir with a glass rod and cast into your ingot.

To remove soft solder from gold.—One of the most serious evils the repairer has to contend with is the presence of soft solder on the piece under treatment, being the imperishable record of some botch; all this must be removed or destroyed before the article can be properly repaired. Workmen generally believe that annealing and boiling out will destroy it, while, in fact, it has the very opposite effect. The heat thus applied simply aids in driving it in, and amalgamating the solder with the gold. We have often tried to remove the solder after the annealing process by scraping and filing, but invariably found that it had penetrated so deeply into the gold that it would be utterly impossible to eradicate it by any such means. One of the common methods of treating this class of solder in the workshop is to remove whatever can be gotten off with the scraper (which consists of a three square file sharpened at the point), and then to place the article in tolerably strong muriatic acid for some time. Nitric acid would answer much better, but it cannot be safely applied to articles of inferior qualities of gold, as it would act upon the alloy of which they are partly composed.

For colored gold, however, it can be used with advantage and safety. From a long practical experience in the matter of soft solder, we have arrived at the conclusion that there is no better way of treating it than that which we are about to point out.

Before, however, describing our hitherto secret method of treatment, it is desirable that we should explain (for the benefit of those workmen who are constantly meeting with this kind of solder in their daily work, much to their annoyance), another system for its removal; one, we believe, only practiced by a few in this country, for we have never yet met with a person who knew anything about it. The solvent employed was a mixture of muriatic acid and crocus, and prepared as follows: To 8 ounces of muriatic acid add 1 ounce of crocus, and shake it well to insure a perfect intermixing; to one ounce of this mixture add 4 ounces of hot water, place in a pipkin and keep up the heat by means of a gas flame; then introduce your soft soldered articles and you will soon be satisfied with the result.

Another method, still more satisfactory than the above one, can be applied to all classes of work, irrespective of quality. It can be used for silver goods, if desired, and that without any injurious effects, while the time consumed in doing it is next to nothing. The solder may be destroyed as follows: Protosulphate of iron (green copperas), 2 ounces; saltpeter, 1 ounce; water 10 ounces. Finely pulverize the copperas and saltpeter, add them to the water and boil the preparation for some time in a cast-iron saucepan; then allow the liquid to cool, whereby it will congeal into fine crystals. If any of the liquor remains uncrystallized, decant it from the crystals and boil it again until it has all been crystallized. These crystals are next dissolved in muriatic acid in the proportion of one ounce of the former to eight of the latter. Of this liquor, again take one ounce and add to it four ounces of boiling water in a pipkin, into which throw the article with the soft solder, applying the heat as aforesaid. The most obstinate cases of soft solder will be cured in a short time.

Pliable gold.—Brittle gold to be used for stamping is one of the crosses of this life. It may, however, be made pliable by the addition of a little Dutch metal when alloying it. Melt your gold with the alloy first, making allowance for a certain quantity of the metal; then roll the bar into a thin sheet, cut it into pellets, put them into the crucible together with the Dutch metal and melt.

Gold from exhausted coloring baths.—The different chemicals employed in coloring are all of them very strong, and being intended to eat away the baser metal, used as alloy, from the surface of the article, and to leave almost pure gold, it stands to reason that it will also corrode a part of the gold, and if the goldsmith were to throw these baths away as useless, he would soon find out at the end of the year that he has been a loser. It is necessary, therefore, to collect them in a sufficiently large stoneware jar. There are several quite inexpensive processes by which this gold can be recovered; for instance, take 2 ounces of green vitriol and about 16 ounces of boiling water, mix together, and, when the vitriol is all dissolved, add it to the solution in the jar and stir it well; the gold will then begin to precipitate; this treatment is to be repeated each time after coloring, and, as the jar becomes full, a little more of the vitriol is to be added and the contents well stirred. If this produces no effect upon the solution, it may be concluded that the gold has all been precipitated.

A Mysterious Jewel Robbery.



TAKE the following occurrence in real life from *London Life*: Mr. Hengist Skidmore is the younger son of a junior off-shoot of an ancient family. The blood that flows in his veins is heraldically very blue, but his fortune, when he came of age, was exceedingly limited, and was soon spent. A Skidmore cannot condescend to commerce, and therefore Hengist, by a contract of marriage, bartered his ancient blood for new riches.

Heraldically Miss Maria Binns never had a grandfather. Her pa, the late Mr. Thomas Binns, began his career as a miner, but being a clever and plucky man he left the coal pit and the country to seek a fortune. When he was abroad his hand seemed to have a Midas touch. He found gold in Australia, struck oil in America, smuggled opium into China, returned to his native land worth full £8,000 a year, became a member of Parliament, was venerated as a distinguished philanthropist, lived on the fat of many lands, died in the odor of sanctity, and his daughter Maria inherited his property. The Skidmore blue blood and the Binns new riches met and married. Before being Binns no more, the lady insisted upon a settlement, excluding her proposed twain flesh from any share in the control of the property; and the bridegroom-elect, being pecuniarily not only off his last legs, but also off his last crutch, assented to the hard conditions. Mrs. Skidmore allowed her husband £400 a year, paid quarterly for his personal expenditure, and affectionately congratulated him on her marvellous generosity.

Mr. Skidmore owed a few debts, and his habits were not strictly economical. Unfortunately for him, the terms of the marriage settlement were not generally known, and, consequently, as the consort of an eight-thousand-per-annum lady, he readily obtained credit from tradesmen and loans from the accommodating gentlemen, familiarly known as "The Uncle." Within two years from the auspicious day when he had leased himself for life to the prudent Maria, he was deeply in debt, and dreadfully dunned. His courage being spurred by necessity, he ventured to ask his wife for a loan. Her reply proved that although she might love him none the less she loved her property the more.

"Hengist, I am not a fool, and I rather would put on weeds to-morrow than give you a sixpence more than your liberal allowance."

Mr. Skidmore applied to his friend Captain Kiddell. The name of Arthur Kiddell is not in the Army List or in the Navy List, but he is supposed to have attained military rank in foreign service. Beside this, he is esteemed to be a very clever man. In chess he has invented a new gambit. He has, he says, played whist with Imperial Chancellors. Professional billiard players applaud his side

stroke. He has, so he avers, won money on the turf. He asserts that he has an infallible system for winning money on the stock exchange.

He would be delighted to help Mr. Skidmore. He was at that moment engineering a stock exchange rig that must be a fortune to those who were lucky enough "to be in the swim." If Mr. Skidmore put in £4,000 he would take £14,000 of the spoils in less than six weeks. But where, O where, was the £4,000? Captain Kiddell would have been charmed to lend the money, but he had already overdrawn his account to oblige a noble friend. The Captain claims to be a Napoleon in finance.

"My dear fellow, you say you have nothing, and so can get nothing, but *ex nihilo nihil fit* is a maxim only fit for greenhorns. You shall borrow the money."

Mr. Chapeau, who lends money on securities that are not negotiable in the bank, agreed to give £4,000 for a £6,000 promissory note at two months' date.

"Chapeau and his tribe have a tremendous swallow. But, my dear fellow, you will net £10,000 at least, and, when you have paid the £2,000, you will be £8,000 in pocket."

Mr. Chapeau was somewhat fastidious for a hundred per cent. per annum lender. He insisted upon Mrs. Skidmore joining in the promissory note. Mr. Skidmore could not even ask her to do it. Captain Kiddell held that a husband had authority to sign his wife's name. Besides, Mrs. Skidmore would not hear of the affair. Chapeau would not part with the note, and it could be paid and burnt in six weeks, a full fortnight before it was due.

Mr. Skidmore had £500 for his immediate wants, Capt. Kiddell kindly advancing £500 to make up the £4,000 for the infallible rig. Alas! even a Kiddell is not infallible, and for once the cute captain was mistaken. The rig totally failed and all the invested money was lost.

"My dear fellow," said the Captain, "I have dropped ten thousand, but I shall win on the double-double venture, for I never go in for mere double or quits. But your fix with the Chapeau note is confoundedly awkward. If your wife wont lend you the money why not borrow her jewels? Being so cruelly cornered it is your duty to help yourself."

"The jewels are in the settlement. Kiddell, I am utterly lost. She will not part with a penny to save me from penal servitude."

"If she had done Arthur Kiddell the honor to take his name in wedlock, she would have been made to part. But, my boy, don't talk about being dry docked. We must weather the storm."

"Chapeau wont wait, and the moment he applies to her my prosecution will begin."

"The most cruel fix I ever heard of! O the vanity and vexatiousness of woman! I suppose the jewels of your wife would pay the bill twice over?"

"The jewels are worth over £20,000. But it is no use talking about her property. In a few weeks a Skidmore will be a convict."

"I will rescue you, my dear fellow. Let us dine, and while we wine discuss my stratagem."

When Mr. Skidmore reached home he was so pale that his wife thought he was ill, and said:

"Hengist, you must see the doctor, for if you have fever I shall at once leave you and go to Brighton. I have such a dread of fever."

Mr. Skidmore not being stricken with fever, Mrs. Skidmore was not obliged to quit London in the midst of season. Twice a week she appeared at the opera decorated with nearly all her costly jewels. Among the constant visitors to the Skidmore box were Captain Kiddell and his friend Count Van de Hoeven.

Mrs. Skidmore went to Brighton for a fortnight because she did not feel quite so well as usual. Whenever she visited Brighton her principal jewels, including the diamond necklace, the diamond bracelets, and the superb diamond cluster that decorated her hair, were taken to the bank. She put the jewels into the jewel box and

locked it. Her husband locked the jewel box in an iron box and attended his wife to deposit the treasure at the bank. No one could charge Mrs. Skidmore with the carelessness that encourages robbery. When she was in town the jewels were kept in an iron safe fixed in her bedroom, that was warranted fire-proof and thief-proof.

If an irresistible force encountered an immovable mass, what would be the result? The answer to this school-boy catch problem is that there cannot be an irresistible force if there is an immovable mass, and *vice versa*. Final or supreme physical force is at present undiscovered. There is no absolute security for property against those who are resolved to break through and steal. That was the bitter experience of Mrs. Skidmore.

The sojourn at Brighton terminated on Friday afternoon. On Saturday afternoon Mrs. Skidmore, attended by her husband, went to the bank and brought home the iron box that contained the jewel case. The lady unlocked the jewel case, glanced at her jewels, relocked the case, put it into the iron safe, and with her own fair hand locked the iron safe. Could fondest mother be more careful of her children than Mrs. Skidmore of her jewels?

Having been operated upon by her lady's maid for a full hour, Mrs. Skidmore departed with her husband for Richmond, having been invited by Captain Kiddell to an early, that is, a five o'clock dinner.

"Now, Hengist, be sure to leave instantly after the dinner, for I am determined to be at the opera to-night."

There was a mistake as to the dinner hour. The early repast was for six, not five, o'clock. Captain Kiddell's party included Count Van de Hoeven, who proposed a promenade in the grounds.

Mrs. Skidmore was walking with the Count. The Captain took Mr. Skidmore aside.

"Let us light a cigar."

The Captain handed his case to Mr. Skidmore and then took a cigar himself.

"Look at that little document before we light our cigars."

The document was the promissory note that had been given to Mr. Chapeau. The Captain ignited a wax match and burnt the promissory note.

"There is an end to the perilous bit of paper. Now, my boy, let us have a peaceful smoke whilst the Count amuses Mrs. Skidmore. As for your being in town in time for the opera, that is almost impossible. Punctuality is not one of the virtues of this pleasing place."

It was nearly seven o'clock before the dinner was served, and it was within an hour of midnight when Mrs. Skidmore arrived at her residence.

"I am vexed about the opera, but I am not sorry to go to bed. I am so drowsy that I cannot keep my eyes open. I suppose the Richmond air is of the sleepy sort."

Mrs. Skidmore had been dozing during the ride home, and she slept while being undressed by her maid. Next day she complained of headache and remained in her room, but about six o'clock felt better and able to be dressed.

"I am glad that I can go down to dinner for our guests would be dreadfully dull if I were not present. Norah, I may as well air my jewels to-night."

Mrs. Skidmore took a neat leather case from her pocket and out of the case a key.

She could not get the key into the lock of the iron safe.

"There is something in the lock. Or else the key is at fault. Norah, ask the master to come to me."

When the maid returned with the master Mrs. Skidmore was still at the iron safe.

"Is it not strange, Hengist, I cannot get the key into the lock? You try."

Mr. Skidmore was as unsuccessful as his wife.

"How provoking, Hengist. I suppose one of the bolts has slipped and we shall have to send for the locksmith."

So saying she put her hand on the handle, and, behold, the door opened.

"I swear I locked it when I went out yesterday. I must have unlocked it without knowing that I did so."

Mrs. Skidmore looked into the safe and screamed. Pulling out some papers and the iron box used for conveying the jewels to the bank, she yelled with horror.

"My dear, what is the matter?"

"My jewels, my jewels, my jewels!"

Mr. Skidmore looked into the safe.

"My jewels! Fool, why don't you do something?"

"My dear, I am so upset that I don't know what to do."

"Go for the police! Go to Scotland Yard. O what shall I do? O my jewels!"

The rage and the terror of Mrs. Skidmore cannot be described. Her magnificent diamonds, worth at least £20,000, were gone. The detectives came and examined the safe, and minutely questioned the servants. Presently they looked at the windows. There was a balcony to the side window, and to one of the girders of the balcony a rope was tied. That indicated the way in which the thief had got in and out of the room. How the burglar-proof safe had been opened could not be explained. The burglary must have been committed while Mrs. Skidmore was at Richmond.

A large reward was offered, and the investigation was directed by Mr. James Burrow, one of the cleverest detectives. After a fortnight there appeared to be a chance for a clew. The pendant to the necklace was a diamond of rather peculiar color, of large size, and it had a slight flaw. Burrow ascertained that such a diamond was in the hands of a London dealer. The jeweler who had sold the necklace to Mrs. Skidmore identified the stone. Burrow tracked the movements of the stone, and found that it had been sent to Holland by a person named Van de Hoeven. But the clue that seemed so promising completely failed. It was proved that the diamond had been in the hands of the dealer and had been offered by him to two leading firms three weeks before the robbery, and Mrs. Skidmore had seen her jewels the very day they were stolen.

"So much for the positive identification of a stone," said Burrow.

Six months passed and there was no hope whatever of recovering the diamonds. Burrow called on Mr. Skidmore.

"Any news now, Burrow?"

"The diamonds are clean gone, but I think I have found out how the job was done. Would you like to hear my views?"

Mr. Skidmore had been treated for a nervous disorder, and he was not well yet. His voice was rather tremulous when he replied:

"Certainly, Mr. Burrow."

Mr. Skidmore turned his face from the detective and appeared to be closely studying the pattern in the carpet.

"Being on another job, by a half chance I discovered that paste imitations of Mrs. Skidmore's jewels had been made by a Paris house about two months before the robbery. Also the imitation jewels were put into a case corresponding in color and shape with Mrs. Skidmore's jewel case. What do you think of that, sir?"

Mr. Skidmore had to clear his throat before he spoke, and still his voice was husky.

"What have paste jewels to do with the stealing of my wife's diamonds?"

"It is the true clue, Mr. Skidmore, just as the rope tied to the balcony was a false scent. The identification of the big stone was correct. The genuine diamonds were stolen weeks before the imitations were taken from the safe. You are pale, sir, and you are shaking as if you had the ague."

"I am not well. I suffer from nervous attacks."

"I could run in the accomplices. Say, a bill discounter who does forged bills, a notorious blackleg gamester, and a foreign party who deals in stolen jewels. But what is the use of running in the accomplices if you mustn't touch the principal?—especially as not a six-

pence of the property can be recovered. I have my eye on the principal and can show you his photo. There it is, look at it."

With a trembling hand Mr. Skidmore took the mounted photograph from Burrow. He looked at it, groaned, gasped for breath, and dropped it.

"Dear me, Mr. Skidmore, I have not given you a photo but a hand mirror. It is your own face that has scared you."

Mr. Burrow put the hand mirror into his pocket.

"It is a queer game, but not new or uncommon. No wonder the detectives are often baffled over these jobs. Good day to you, sir. I think you will now agree with me that to me, as well as to you, the Skidmore jewel robbery is not a mystery."

Hearing.

[BY DR. C. A. BUCKLIN, NEW YORK.]



HERE ARE many very peculiar phenomena in connection with hearing which are amusing, simple and instructive lessons in physics. I am greatly amused at the grave nature of the discussions which take place among the really profound ear doctors at their annual meetings. One man states a fact and offers an explanation of the same in a very dogmatic and positive manner. He no sooner takes his seat than some one finds the idea just advanced does not correspond with his pet theory, and then there is a general row.

To illustrate: Some people certainly can hear the lowest conversation while in the presence of a continual noise, as the noise of a railway or the rattle and noise of the machinery of a large mill, who are unable to hear any conversation when the noise ceases or the train stops.

Some have attempted to explain the peculiarity by supposing the person is deceived. They jump at the conclusion that the statement of the individual is not reliable, and that the only increase of hearing which the person thinks he experiences during the existence of the noise, is due to the fact that people talk louder in the presence of noise than they generally do.

This supposition, however, falls to the ground the moment you meet an individual who has this phenomenon so plainly developed, that while the car is in motion you have no difficulty in making him hear you while conversing in your usual tone of voice, but he is utterly unable to hear you the moment the motion of the train ceases without shouting in close contact with his ear.

Some prominent men claim that this phenomenon is present to a greater or less extent in all persons having catarrhal deafness, while others claim that it is not. I have heard hours of cross-firing between prominent ear doctors, who had neglected to carefully study their physics during an academic or scientific course of study preparatory to studying medicine.

They appear to think that in the study of their specialty they have struck a nut to crack which should dazzle the most brilliant intellect. My experience is that some persons having catarrhal deafness who cannot hear conversation when in quiet surroundings, can hear quite plainly when the surroundings become noisy. Others having the same disease have this peculiar phenomena developed only to a moderate extent, and in others it is entirely absent. In our description of the mechanism of hearing it was seen that the vibrations of the ear drum were transmitted to the cavity containing the nerve cells by direct contact; this direct contact was made through a small chain of bones, the jointing of which was universal.

It certainly does not take any amount of credulity to admit that in inflammation of the middle ear, the joints of this little chain of bones may become so stiffened that the slight vibrations of the atmosphere, caused by conversation, are not sufficient to set them in motion, but when strong vibrations are thrown against the drum from noisy surroundings the joints are set in motion, and while in

motion they are sufficiently sensitive to receive and transmit the additional but weaker vibrations produced by the human voice. Upon this supposition, to one acquainted with the curious phenomena of vibrating bodies, this peculiarity of hearing becomes very simple to appreciate.

No one can foretell in any case of catarrhal deafness whether one will or will not hear decidedly better when surrounded by loud noises. Those who have this phenomenon decidedly developed, certainly have a form of catarrhal deafness which never can be cured. Another peculiar mechanical phenomena in all diseases of the external or middle ear, is when vibrations are carried by direct contact from the bones of the skull to the internal ear, the noise always sounds louder in the affected ear than in the healthy ear.

If the details of this experiment are properly carried out, it will always be found that any person with a diseased ear who does not hear the noise from a vibrating body better in the diseased ear than in the healthy ear, has an incurable ear affection. The fact that the diseased ear hears the rumbling noise the most plainly is, therefore, a favorable symptom.

To make a test of this experiment one should have a heavy tuning fork of ten to twelve inches in length; the ends should be clamped with metal clamps. After striking such a tuning fork and bringing the handle firmly against the forehead, the most un-intelligent individual who has any trouble with the external or middle ear will promptly tell you that the noise produced sounds louder in the affected ear. Notwithstanding the simplicity of the requirements of this experiment and the reliability of its results, you find men of reputation constantly disputing its reliability. When you examine the tuning fork they are experimenting with, you find a little fork six inches long, the note quite high and the ends of the fork not clamped.

Such a fork gives the true note corresponding to its length, but it also gives quite distinctly the same note one or more octaves higher. Under these circumstances it takes a very intelligent observer to tell in which ear he hears the noise the loudest. The over tone is usually heard in the best hearing ear because of the sharp aerial vibrations, while the ground tone, the vibrations of which go directly to the internal ear through the bones of the skull, are heard most distinctly in the diseased ear. I have never seen in the hands of any ear specialist in this city a tuning fork which properly meets the requirements for this experiment. They ignore their ignorance of the requirements of a tuning fork which makes this experiment a success, and also ignore any suggestions which are made on this subject.

The rational explanation of this phenomenon is as follows: The sound waves reaching the internal ear on the affected side, are prevented from escaping with the same facility they do from the other ear. This is usually due to the inflammatory thickening in the affected ear. We have, in fact, the same conditions as the railway train passing through a tunnel. Certainly in this case the noise of the train is greatly increased.

The fact that in ears which are very deaf from catarrhal disease the conduction through the bones remains good, has led to the invention of the audiphone or dentiphone. It is a hard rubber fan, the fan of which is brought into tension by a string, and the vibrations which it receives are communicated to the teeth through the handle, and thus conducted to the internal ear without passing through the usual hearing apparatus. Although this instrument is of great assistance to some, still it does not meet with the success which was expected from it. I think, however, as an example of applied scientific principles, it is a very ingenious contrivance.

In our next we will take up some of the peculiar phenomena of hallucinations of hearing, which are of a much more mysterious nature than any of the above described phenomena, which can be readily explained on a purely mechanical basis.

Enquiries will be cheerfully answered if the patrons of THE JEWELERS' CIRCULAR have any to make.

Lives of Celebrated Horologists.

MATHIAS HAHN.



THE DISCOVERIES and inventions made in horology during the 18th century may well be ranked among the most eminent of the art. Watchmakers, aided by advancing education, gradually began to more fully comprehend the power and adaptability of wheels and pinions, and the manufacture of complicated clocks and automata, hitherto confined to mathematicians and astronomers, was with avidity seized upon and improved by the watchmaker at large. New escapements were planned, existing ones were improved—in fact, the horology of our day commences only with the introduction of the pendulum, claimed both for Huyghens and Galileo, and the balance spring by Dr. Hooke. In order not to disarrange the interesting series of inventions, let us commence our dates from the application of the pendulum to clocks, 1656.

In 1658, Dr. Robert Hooke invents and applies the balance spring.

In 1675, the repeating timepiece, first for mantel clocks, next for watches, is constructed by Barlow and Quare, of London.

In 1680, Clement, of London, invents the clock anchor escapement.

In 1695, Tampion invents the dead beat anchor escapement, and uses it for a watch.

In 1700, Fatio, of Geneva, perforates rubies and uses them as jewel holes.

In 1715, Graham invents the compensated mercury pendulum, invents the cylinder escapement for watches, and the dead beat anchor escapement for astronomical clocks.

In 1726, John Harrison constructs the compensated gridiron pendulum, and in 1761, when 67 years old, constructs the first marine clock.

In 1754, Canon de Beaumarchais invents the pin escapement for watches.

In 1765, Pierre le Roy invents the compensated balance.

In 1770, Duplex, an Englishman, invents the escapement named for him.

In 1772, John Arnold makes several valuable improvements, and then invents the marine chronometer with detent escapement.

Next to the English rank the Swiss in importance. Neuchatel and Geneva contained various large industrial plants, in which watches with all the improvements of the times were manufactured and shipped to all parts of the world, as an article, no longer of luxury, but of necessity. One of the most deserving of Swiss watchmakers was Ferdinand Berthoud, born in 1727, in the Canton Neuchatel. He exerted an extraordinary influence on horology, not only by his writings, but also by his works, which were esteemed as excelling in quality those of Harrison. His passion for the art was so great, that at the age of 80, he went to California, at that time truly the *terra incognita* of the world, to ascertain the rate of a clock with a new escapement he had sold thither, and he died, as it were, in the presence of his clock.

Another Swiss watchmaker of great renown was Pierre Jaquet Droz, born in 1721, at La Chaud-de-Fonds, in Neuchatel. He had originally been destined for the church; but evincing a decided passion for horology, he became a watchmaker, inclining, however, more to the origination of automata, than to the construction of the watch. He introduced bell chimes and flute playing to clock movements. His experiments for inventing perpetual motion, which has always been the *fata Morgana* of watchmakers and mechanics, caused him to make various important and practical inventions. He constructed an automatic writing figure, which moved hands and fingers, and wrote its letters in a surprisingly correct manner.

This fancy, as well as mechanical skill of the father, descended to his son, Henri Louis Jaquet, born in 1752, at Chaux-de-Fonds. After he had learned watchmaking with his father, he went to Paris, and excited great attention by the skill of his automatical figures

Among others, he constructed a young girl who played several pieces upon the piano, followed the notes with eyes and head, and, after having finished playing, arose and made obeisance to the company. He also drew the plans for the construction of a pair of artificial hands for a maimed person, which he could use almost equal to the natural. The Droz family is still accounted to the most ingenious and influential of Switzerland.

History has almost forgotten to record the name of another very ingenious person, although no watchmaker—the Reverend Mr. Hahn, born in 1739, near Stuttgart, Württemberg. From childhood up, he evinced a great inclination for astronomical pursuits and the mathematical sciences. He almost neglected the study of theology, to devote himself to mathematics, when at Tübingen, and is said to have understood far better the manufacture of sun-dials, speaking tubes, telescopes, etc., than the expounding of doctrines, and he lived on bread and water, to save money for purchasing lenses, etc. He passed examination at all events, and became a country parson, in which office he died in 1781.

His clerical duties left him sufficient leisure to devote to his mechanical pursuits, and offered him the means. He was for a number of years engaged in the construction of a large astronomical clock, which was to show the course of the earth, and the other planets, also that of the moon and various other satellites. "When," says Hahn, "I was engaged in the calculation of the wheels for the satellites, I found the arithmetical work overwhelming, on account of the tedious and difficult multiplications, divisions, and fractions, to such an extent that the work dulled my understanding, and began to seriously interfere with my clerical functions. I then remembered that Leibnitz had sought to invent a calculating machine; but labored long and unsuccessfully in its construction. I saw the point where he failed, and undertook to construct one. I believe I need not say that it was not the work of a short time or that I was successful at the first trial; in fact, several years elapsed until, finally, the machine was perfect. The greatest trouble I experienced was to carry the excess of the 'unit column' over into the 'tens column,' the most difficult spot, where Leibnitz's attempts had miscarried."

This calculating machine, the only one until then, is of the shape of an upright standing cylinder, of 9.84 inches in diameter, and 4.72 inches high. It has a crank in the center, like a coffee mill, with which the machine is actuated. Above upon the cylinder stand in two circles each fourteen dials, and corresponding to these, on the edge, fourteen little winding squares. Both dials and winding squares each contains the numbers for 0 to 9. The external circle of dials, as well as winding squares, are used for adding and subtracting; the internal circle is operated for multiplying and dividing. It is easy with this machine to solve every question in the four kinds of calculation up to one thousand millions. This interesting machine is still in the possession of a citizen of Stuttgart, as well as the directions for use written by Rev. Mr. Hahn.

His astronomical clock, for which the calculating machine was invented, experienced many reverses, and finally fell into pieces; finally, some one bought all the parts and presented them to the Museum at Nürnberg. It was a present of a doleful value—this pile of wheels, pinions, cogs, rods, wormwheels, etc., until another mathematical genius attempted to restore them into order, which he successfully did after a labor of nine months, and the clock stands at present in the mathematico-physical division, a wonder to all.

A newspaper description of the year 1878 says that this clock is to be considered a purely scientific one. It has no apostle walks, no curiosities to attract the great public; no crow of cock, not even a striking work; nothing that could possibly recommend it to the thoughtless sightseer. It serves simply for scientific purposes, and it is astonishing with what precision and punctuality it performs this its functions. The work stands sole of its kind, as regards the concentration of mathematical knowledge, which permitted him to crowd so vast a number into so small a space, and to actuate it with

so small a power; beside this the ingenious ideas for accelerating or retarding its different motions are simply marvelous.

The clock consists of four independent parts, but is propelled by a single weight of 46 pounds, located at the central part, situated in a case. This has three dials, the upper one of which indicates the ordinary time in hours, minutes, and, by a special hand, also the seconds. From the hour wheel the power is transported to the second dial. This indicates the running calendar, month, date, and day of the week, whereby at the same time the corresponding months receive their 30th or 31st day, and in February the days from 29 to 31 are omitted by an ingenious arrangement, which is also used for the bisextile years, in which the 29th February is not omitted, nor in the bisextile centuries, when February has 30 days.

From the second train the power is transmitted to the other parts, first upon the dial indicating the year; this dial has two hands actuated by springs; one hand indicates the year in a circle divided into one hundred parts, and moves once every year, thus requiring one hundred years for one revolution; the other hand points out the centuries in a circle divided into eighty parts, moving forward once each one hundred years, and, therefore, requiring eight thousand years until one revolution is accomplished.

Hahn, who was an adherent of the mystic, had calculated from St. John's Revelations the end of the world and arranged his clock until that eventful period; he therefore carried the division only to the year 7777, leaving a blank space between this time and the year 8000, where the circle closes. To compensate for this "speculation in futurities," he introduced a mechanism by which the clock can be worked backward as far as the creation of the world, and the journey is enlivened by the old milestones of Biblical data and occurrences indicated on the third dial.

The hour hand which indicates the hours of the day and night, located on the second dial, actuates by a carrier three springs which communicate the 24-hour revolution to the three adjunct works.—One of these exhibits the seven old planets in their proportionate distances, the inclination of their orbits, their relative positions in the Zodiac, and their correct time of revolution. Uranus has the longest period, 83 years; next follows Saturn with 29½ years, and our earth with one year. The second adjunct work may be called a satillarium, as it specially shows the motions of the earth, Jupiter, Saturn, and Uranus, with their satellites, as well their times of revolution as position in the Zodiac. The rotation of the sun around its own axis has also been provided for. Our own moon, the four moons of Jupiter, the five of Saturn and the two of Uranus accomplish their courses around the main bodies at the precise time.

Another adjunct work stands upon the closet, being a celestial globe with the earth located in the center; it consists of two copper hemispheres, which inclose a separate, invisible work of an astonishingly ingenious composition. It consists of 82 wheels, shows the position of the planets in the stellar sky, courses of the sun and moon of the lunar charts, total and partial eclipses of these two orbs, as well as the age of the moon and its position to the earth.

A similar clock also belongs to the remarkable objects in the Archive of the Württembergian Antiquities in Stuttgart.

Rev. Mr. Hahn also opened the first watch factory in his district, and thus the watch, heretofore the problem of science and plaything of the rich, became the basis of welfare and the avocation of distinct organizations.

Amber.



AMBER is the beautiful name of a beautiful substance, the origin of which, though long involved in mystery, has now been completely elucidated and made "as clear as amber" itself. Some Prussian botanists have been examining the formation of the Baltic shore whence this fossil gum is obtained, and not only have they

distinguished the trees from which it once oozed, but they have referred each of the different varieties of the mineral to the individual species of pine or fir that originally produced it. From their researches it would appear that once upon a time the land which is now the Baltic sea was a superb forest of conifers, some of them those giant trees that are to-day the pride of California, others the cedars which still tower supreme in the East, together with the firs, spruce, and cypress of England and other countries. Convulsions of nature, earthquakes and deluges, glacial and volcanic catastrophes have long ago rent continent from continent, and thus the trees which once grew together upon what is now the Baltic sea are now as widely separated as the red wood pine that overlooks the Pacific slope and the cedars that darken Lebanon in the Levant, as the Scotch fir, the glory of the Highlands and the badge of the clans, and the African arbor-vitæ that gives the Hottentot his firewood, and the dwarf Bosjeman the wood for his bow. Yet, though thus scattered now, these plants once kept stately company together on the wind-blown ridges of the northern hills in Niflheim, "the land of eternal winter," in the days before Asgard was, and while as yet there was no hammer in the hand of Thor. There and then, in an age of gloom and in the midst of the terrific processes by which nature was preparing the world for the coming races of conquering men, those grand old trees were piling up about their roots, for the mystery and delight of the future, the golden gum which we call amber. Wherever the storm had wrenched off a bough, or bird, or animal or insect had wounded the bark, there distilled from the hurt, trickling down the bole or dripping out on to the ground beneath, the beautiful balsam that men for ages puzzled over, calling it the "tears of the sea birds," or, "sea gloss," "succinum," "the gum stone," "electron," a gift from the sun. But, whatever name they gave it, all the nations of antiquity delighted in it, wondering at its beauty, and imagining in it strange mythical properties. Nor in modern times, though we have found out the secret of the exquisite object, has admiration lessened. Indeed, the researches into its origin have recalled new beauties in it; and, while displacing the tender superstition of the ancients, some of which were given in an earlier number of THE JEWELERS' CIRCULAR, have invested this fascinating and suggestive antiquity with higher claims to a more rational interest. It is no longer the tears which the Electrides, transformed as poplars upon the banks of the Eridamus, shed for the fate of their brother Phaeton; but it is a legacy of great value and surpassing beauty, bequeathed to these latter days by the splendid forests of a perished continent.

The value of amber is far greater than the majority imagine, small pieces of indifferent quality suffice for the mouthpieces of pipes and for isolated ornaments; and, though the prices charged for even such specimens as these are far above their actual worth, they are comparatively cheap. In necklaces, however, where every bead has exactly to match its fellow, or in the larger articles, requiring to be cut from a single piece of considerable size, the cost and real worth of the fossil gum rises so rapidly that in certain cases it deserves, if the money charged for it be any criterion, to rank with the precious minerals, and many pieces of amber in the rough state are worth more than the bulk in gold. Yet even this does not approach by a long way the esteem in which antiquity held their electron; for not only was amber the oldest of gems, and, therefore, in a measure magnified by traditional reputation, but it was supposed to possess amazing occult properties. It was worn all over northern Italy as a preventive of goitre, just as it is worn to-day by the people of Arabia as a talisman against the evil eye. More powerful than sorcery and witchcraft, it was an amulet that made poisons harmless; ground up with honey and oil of roses it was a specific for deafness, and with Attic honey for dimness of sight. Nor is this claim of medicinal virtue altogether without foundation in fact, for "its efficacy as a defense of the throat against chills"—owing probably to "the extreme warmth when in contact with the skin, and the circle of electricity so maintained"—has been tested and substantiated. The ancients, however,

were not content with mystic curative powers in the solid substance, for they ascribed valuable properties to it in combustion, admiring the perfume that resulted, not only for its resinous fragrance, but for its healthiness, thereby innocently detecting in the fossil pine gum the same virtues that modern physic attributes to the living pine trees. In many parts of the East, especially in China, where prodigious quantities of Prussian amber are consumed, this substance is preferred to all others for incense; and thus the Buddhist shrines in the palaces of Peking and the holy places of Mohammedan Mecca alike owe the fragrance of pious fumes to the same strange beautiful source, the dead fir forests of a pre-historic Europe. Nevertheless, the chief charm both for the past and the present lies in the positive beauty of the mineral. It is the only gum specified in Homer, and the earliest specimens of Etruscan jewelry are carved fragments of the "lynx-stone"—for among other quaint surmises as to its origin was one that supposed it to be a product of the lynx, just as the eagle had the ætites, the toad its buffonite, the cock its electryon, the kingfisher its halcyonite, the swallow its chelidone, and other beasts and birds their appropriate minerals, either carried about in their heads or other parts of their bodies, or distilled upon occasion. Has not the snake to this day a jewel in its skull in all superstitions; and, in the East, does not the horse possess the yedh, that wonderful stone, which, properly used, can call down rain from the clouds? That the lynx should produce amber was, therefore, not more wonderful than that the whale, as it really does, should produce ambergris. Every writer of antiquity however, who refers to it, always gives amber, by whatever name he may call it, the place of honor as the most beautiful gem in his catalogue, and the supreme ornament of princesses or heroes. Nero, the enthusiast in perfumes, music, and gems, possessed so much that on one occasion all the weapons and articles used in the amphitheater were made of it, and the ropes around the arena were hung with balls and lumps of it; and, so sensitive was that dainty monster of the beauty of the thing, that, singing the charms of his Poppœa, he calls her hair amber-colored. Yet this does not of itself prove, as some suppose, that Poppœa was a blonde; for, apart from the fact that the Roman ladies of Nero's time bleached their hair to the same tints of tow that modern fashion has familiarized, amber, as known to the Romans, varied from primrose to black. Not only is the charming fossil found ranging through all the shades of yellow to fulvous auburn and the strange mixed colors of jasper, but it deepens into such dark browns and vinous purples as almost to rival the hue of jet. Poppœa, therefore, in spite of her "amber" hair, may have been as dark as Cleopatra or Judith; but it is in evidence of Nero's taste that he applied the exquisite epithet to the most exquisite of a woman's ornament—her hair.

Nor in the choice of things of beauty can woman's judgment be gainsaid. As Darwin has shown, we owe nearly all that is most charming in animal nature to the preferences of the sex. And she has dignified amber with her approval from the earliest times. Go where the traveler may—in Europe, or Asia and some parts of Africa—he will find the "gum-stone" among the precious possessions of women. What an inordinate value the Arabs' wives in Aden attach to those translucent lumps of amber which they wear around their necks! Their clothes, their babies, even their hair may be bought; but only a large bribe, for more than the market value of the uncouth though splendid beads, or the fear of the thick staff of their avaricious and fiercely-bearded spouses, will persuade them to unthread that magic necklace. High up in the Himalayas, again, irregular pieces of clouded amber are found as the central ornaments of the wondrous tiaras and cinglets which the hill dames wear, richly set in turquoise-studded silver. In Europe, female fashion, always tending towards the rarest, has left amber behind; but science, for the sake of the relics of an old world that the fossil often contains, has largely replaced fashion, while, in spite of all the imitations that copals, Australian gums, or chemistry can devise, the true substance is annually finding a larger range in the service of the smoker. To

the practical mind of the nineteenth century it commends itself for the purpose from its peculiar combination of a certain elasticity between the teeth with hardness and cleanliness. It really, however, owes its origin as the chosen material for the pipe to the tradition of its resisting the influences of contagion, for in the East, where it was first used for this purpose, the pipe is a social symbol, and, like the "loving-cup," is passed round from mouth to mouth; so the special property of amber, that it could not suffer contamination, was all-important. Again, how easy a traitor might have poisoned a guest, had not the mouth-piece been a certain prophylactic against all secret venoms! Thus, even in our modern usage of the material we perpetuate a superstition; and, though the science of to-day has told us all the secrets of those dead pine-forests, the cedars and the cypresses that lie under the waves of the Baltic Sea, we cannot, if we would separate our own preferences altogether from those of the past when the world spoke, as of a mystic race, of the Aestyi, "the amber-gatherers," and, as of a myth, of the northern seas where the golden lumps floated on the shore "in the first moon of the Spring." Nor does it in any way detract from intelligent interest in the beautiful product to know that once upon a time the very beads we see worn in our streets dripped from the giant firs that clothed the Northland hills, nor from the pipe mouth-piece of to-day to cast a backward thought to the bygone ages when, in the shadowy land of Odin, those old trees stood there, in vigorous phalanx, embossed, and belted with amber.

The Characteristics of Metals (Ductility, etc.)



IF AN EXTERIOR force operates upon a solid body, it will, even if not perceptible, produce a change of form of the latter. If, for instance, an iron rod, supported at its two ends, is weighted in the center, it will bend increasingly so in ratio with the weight.

One of three things will occur on the cessation of the strain: either the bending disappears or it remains, or else the rod breaks.

In order to ascertain the cause of this phenomenon, and to satisfactorily explain the different occurrences taking place in the working of the metals, we must cite in elucidation several laws of mechanics and physics. According to the doctrine of physics we have to imagine each body to be composed of a number of minute particles which can no longer be divided, and which are unalterable in their form and characteristics in the same body. These smallest particles are called atoms, and it is presumed that they do not touch each other, but are surrounded by an envelope of an imponderable substance called ether. In rigid bodies these atoms lie in a definite position and at a certain distance from each other, and are retained in this position by an attractive power existing between them, which has been named force of cohesion. If between the atoms of a body there were in operation only this power of cohesion, then they would eventually be drawn so closely together that a condensation of the body would result. It is presumed, therefore, that the ether envelopes mutually repel each other, and by the operations of the mutually attracting and repellent forces, which are also called molecular forces—the atoms, together with its ether envelope, being called a molecule—a condition of equipoise of these opposing forces exists in the body. By various external operations this condition of equipoise of the molecular forces can partly be disarranged, and either the one or the other will become predominating. By heating, for instance, the cohesive power is diminished, and the repulsive force of the ether envelopes causes the molecules to remove from each other, so that the heated body expands or assumes another state of aggregation. (Solid bodies fuse and fluid bodies evaporate if sufficiently heated). As soon as the heat ceases, the attractive power of the atoms again asserts its presence, and the molecules re-approach each other (the fused bodies solidify, etc.)

Mechanically operating forces, also, as we said above, can produce a change of form of the body, changes which are either temporary or permanent.

The forces, productive of a change of form, can, in widely different manners, operate upon the molecules of a body. If we imagine of two of them, one to be stationary and the other mobile, then the force may, in a straight line passing through the centers of gravity of the two molecules, operate either in such a manner that a repulsion or an attraction of the two molecules takes place. In the first case is produced a draft, in the second a pressure. If the force operates in a direction tangential to the connecting line upon the one molecule, it will be displaced without removing from the other—a bending occurs. But if the force operates normally against the line of the center of gravity, displacement and separation of the two molecules occur, this condition is called shearing strength. If, however, the force seeks to revolve the movable molecule around a line which does not coincide with the line of the center of gravity, torsion ensues.

If the influencing force does not exceed a certain quantity, the body will resume its original form as soon as the force, which altered that form, ceases to act. This characteristic of bodies, viz., to assume changes of form produced by externally acting forces, and which, by reason of the action of the molecular forces, are neutralized again, are designated as "elasticity" or "spring power." The operative watchmaker understands this force too well to demand a pointing out by us.

If the external force operates with such strength that a permanent change of form ensues, the limit of elasticity has been exceeded and the molecules have assumed another position to each other; they remain permanently in a condition of tension.

If the force operates for some time or increases, the connection of the molecules (the cohesion) is more and more dissolved, and fracture or rupture finally ensues.

From these propositions it will be seen:

1. That a body must never be taxed beyond its limit of elasticity for its power of resistance; and that,
2. A permanent change of form, such as is always sought to be produced in metal working, can be effected only when a body is taxed beyond its limit of elasticity.

If, therefore, a body is to suffer a permanent change of form, it must admit of a displacement of its atoms far beyond the limit of elasticity; without that their cohesion sensibly diminishes—it must be ductile, tenacious and supple. If a body is not ductile, it is called either brittle or friable in accordance with whether it is at the same time hard or soft.

The ductility of the different metals varies exceedingly, and, beside this, they vary in accordance with whether their powers are taxed by draft or by pressure.

As possessing the former characteristic (ductility by draft) we may class the more important metals and alloys as follows:

Gold, silver, platinum, aluminum, phosphor bronze, finely grained iron, steel, brass and pinchbeck, containing zinc up to 30 per cent., German silver, copper, nickel, fibrous wrought iron, ordinary bronze with, at most, six per cent. of tin, zinc, tin and lead.

As regards ductility by stamping and hammering, pressing, rolling, the serial proportions vary somewhat.

Gold, silver, copper, aluminum, phosphor bronze, brass and pinchbeck with zinc up to about 30 per cent., German silver, tin, platinum, lead, finely grained iron and steel, zinc, ordinary bronze with tin up to 6 per cent., fibrous wrought iron and nickel.

The majority of the metals can be worked by hammering and coining; few of them, however, can be rolled and drawn. In a certain sense hardness is opposed to ductility. Under hardness we understand the quantity of resistance offered by a body to a permanent change in the layering of its molecules. The harder, therefore, a body is, the more work is required to cause it to assume a definite change of form. The hardness of the metals and, conse-

quently, also their dilatibility, varies with the temperature. By an increasing temperature diminishes the hardness and the elasticity of those metals which, in fusing, do not pass suddenly but gradually into the fluid condition. Corresponding to the diminution of the hardness takes place an increase of ductility. As we mentioned in the beginning, the heat overcomes the cohesion of the molecules. For this reason, the metals are with greater facility worked in a heated than in a cold condition. But with heating is connected the diminution of solidity. Tin, for instance, when heated to nearly its degree of fusion, becomes so vitreous that it can be pulverized.

The limit of elasticity, in many cases, diminishes far quicker than solidity, and this difference becomes increasingly noticeable when the metals are subjected to pressure. The farther apart the limit of elasticity and the solidity, the greater is the dilatibility of a metal.

Chemical admixtures exert a great influence upon the ductility of the same metal. How small the quantities of such impurities need be, in order to totally change the quantity of ductility, will be seen from the fact that $\frac{1}{10}$ per cent. of bismuth, or the same quantity of lead, suffice to deteriorate the workable quality of gold and silver to such an extent as to render it perfectly useless. On the other hand, Dr. Fleitmann has made the discovery that nickel, which hitherto has been considered undilatable, can easily be rolled, stamped and hammered, if only a minute quantity of magnesium is added.

In many cases, again, the quantity of the ductility of a metal suffers a very essential influence by the occurring change of form itself. From the changed layering of the molecules arises a certain tension, the limit of elasticity and hardness increases, with continued working the former approaches more and more to the limit, when rupture takes place and ductility ceases.

This progress is almost unnoticeable in the so-called soft metals (lead and tin), perceptible in gold and silver, very plain in copper, and to a still higher degree in iron and steel. This decrease of ductility is apt also to show itself in an increased measure, when the metal has been alloyed with another one or contains combinations with metalloids in solution. Gold and silver, containing copper, more quickly lose their ductility than the pure metals; bronze and brass quicker than pure copper; steel quicker than wrought iron, etc. It is known that the former ductility may be restored by heating the metals that have become brittle in this manner; this ductility may often be increased thereby; both hardness and limit of elasticity are restored to their former quantity, while solidity has in the annealed condition become greater by working than it was heretofore.

Beside ductility and hardness, we must consider another property which is turned to account in working metals; we refer to their capacity for welding. By this is understood the property of various metals to unite by the use of strong heat and the use of suitable pressure. As possessing this capacity of malleability we may point out: Wrought iron, steel, copper, nickel and platinum, and, to a certain extent, also gold and silver. Most easily welded is wrought iron, if heated to white heat, and this temperature is called welding heat. Platinum is to be heated more strongly, copper less.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of February 16, 1886.

336,460—Timepieces, Auxiliary Governing Spring for. M. Wheeler, Washington, D. C.

336,360—Watch Regulator. G. I. Tuttle, Aurora, Ill.

Issue of February 23, 1886.

No jewelry patents included in this issue.

Issue of March 2, 1886.

337,067—Clock, Electric Alarm. C. Korfhage, Brooklyn, N. Y.

336,995—Clock Striking Mechanism. A. Fischer, White Hall, Ill.

337,020—Clock Striking Mechanism. A. Fischer, White Hall, Ill.

16,556—Jewelry Rack. C. Place, Cambridge, Mass. Design Patent.

Issue of March 9, 1886.

337,377—Clock. W. D. Chase, Hackensack, N. J.

337,384—Clock Pendulum. S. Eastman, Providence, R. I.

337,383—Clock, Secondary Electric. V. Himmer, New York, N. Y.

337,383—Clock, Secondary Electric. D. F. Sweet, Grand Rapids, Mich.

337,736—Clock, Striking. H. L. Buggemann and C. G. Orth, Cleveland, Ohio.

337,784—Clock, Striking. H. F. Northrop, Assignor to Waterbury Clock Company, Waterbury, Conn.

337,385—Clocks, Electric Regulator for Pendulum. S. Eastman, Providence, R. I.

337,419—Clocks from a Distance, Apparatus for Regulating Pendulum. G. W. Millard and J. H. Clarke, Providence, R. I. Four Patents.

337,798—Jewelers' Cabinet. T. W. Sweney, Reading, Pa.

337,365—Watch Case Spring. A. L. Blankenmeister, Marissa, Ill.

337,960—Watch Springs, Making. J. Logan, Waltham, Mass.

337,529—Watches, Escapement Lever for. W. B. Simpson, Holden, Mo.

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At the regular monthly meeting of the Executive Committee of the Jewelers' League, there were present Chairman Geo. R. Howe, and Messrs. Bowden, Greason, Lewis and Sexton.

Five (5) changes of beneficiary were granted.

One resignation was accepted.

An assessment of four dollars was ordered on account of the deaths of S. L. Bauman, of St. Louis, and Roland Boullemet, of New Orleans.

Four (4) applications were referred for investigation, and the following 24 applicants were admitted to membership, the majority of them coming under the provisions of the new graded assessments for members over 30 years of age.

W. H. Bradley, J. L. Brown, Alex. Doninick, M. Goldberger, M. Kleinberger, New York, N. Y.; Chas. B. Luf, Brooklyn, N. Y.; W. W. Scott, Watertown, N. Y.; Chas. G. Browne, Boston, Mass.; G. H. French, North Attleboro, Mass.; E. C. Gifford, Fall River, Mass.; E. S. Fowler, G. K. Harrington, Chicag@, Ill.; J. B. Eibler, Wm.

Arnold, Ann Arbor, Mich.; O. F. Zimmerman, Jeffersonville, Ind.; C. E. Kuhlmeier, St. Louis, Mo.; H. M. Holton, Elkhorn, Wis.; J. H. W. Pflueger, Covington, Ky.; A. H. Clawson, Catlettsburg, Ky.; Jos. Cohn, Leadville, Col.; J. S. Bredenbeck, Fargo, D. T.; S. Spitz, F. W. Wientge, Santa Fe, N. M.; G. Dickman, England.

During the evening there appeared before the Committee two persons who had been dropped from membership by the action of the Executive Committee at its February meeting. This action was in accordance with Article VII. of the Constitution, as follows:

ARTICLE VII.—MISREPRESENTATIONS, ETC.

SECTION I.—Falsehood, misrepresentation or prevarication on the part of any member, or of any other party in his behalf, through procurement or arrangement on his part, with reference to any application for membership, or any papers or evidence required in connection with such application, shall forfeit such member's claim to the benefits of the League, and all such cases shall be decided by the Executive Committee.

One of these persons, employed in a lithographic establishment, stated in his application, which had been approved in December, that he was a jeweler; the other person endorsed his application. The misrepresentation was brought to the notice of the Executive Committee by a faithful member of the League, and both of the persons were dropped from the roll.

In consideration of extenuating circumstances, the one who endorsed the application was reinstated; the applicant himself was *not* reinstated, and his futile attempt to join the League under false pretenses should be a warning to all members to exercise caution in recommending persons who are ineligible.

One great source of the strength of the League is its strict confinement to the jewelry and its kindred trades.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

AN ART SCHOOL NEEDED.

To the Editor of the Jewelers' Circular:

I am a young man, just out of school; for a long time I have been considering what occupation I should devote myself to, for I have got to earn my living. My parents are poor, my father being a mechanic, and while unable to give me a college education, he has kept me steadily at the public school. The time has now come for me to strike out for myself, and I have determined to learn a trade. It occurs to me that I should like to learn the jewelers' trade, and my object in writing to you is to ask how I must go to work to get the opportunity. I have some facility in drawing, and have been told that I show evidence of a talent for designing. I would like an opportunity to learn a trade where there would be some call for such ability as I may possess in an artistic direction. Is there not some school of instruction connected with the jewelry trade where I could learn something of its requirements. I would be obliged if you would answer this, for I do not know where else to apply. I have seen but one copy of your paper, but thought you would be a good person to consult. Please let me know how I can get the chance to learn the jewelry trade, and much oblige, yours truly, J. H. M.

[Unfortunately, there is no such school of instruction as our correspondent refers to, but there is abundant room for one. We have had numerous applications similar to this within the past few years, but have never been able to give the writers any other answer than to direct them to apply to some manufacturing jeweler. The necessity for an art school in the interests of the jewelry trade has long been felt by the best men in the trade, who often feel the want of

intelligent, trained labor, as well as the talent required to elevate the standard of their productions. The public schools now turn out many pupils who have had their attention directed to art matters more or less, some of whom would, with a little instruction, become good and original designers; others, like our correspondent, are ambitious to learn some trade wherein their artistic instincts would find employment, and, at the same time, make their mechanical labor more valuable. The hope is entertained by many that some time there will be an industrial school established that will fit young men for the higher branches of the trade, and develop more of the native talent that now goes to waste in subordinate positions. Hundreds of young men now take situations in stores and offices because the facilities for learning trades are inadequate, and because there are so few of these that require talents of an artistic nature. The jewelry trade is a most progressive one, steadily pressing forward in the realms of art, and there is a growing demand for ambitious intelligence; there is plenty of this to be had if only the proper methods for its training are provided. Until this is done, young men desiring to enter the ranks can do nothing but commence at the bottom, and submit to all the drudgery attendant upon the acquirement of the purely mechanical part of the business. If they rise above this and endow the trade with their artistic talents, they do so in spite of their surroundings and not because of them. For the encouragement of these young men, we may add that the best talent in the trade has come up from the bench, and possibly is the best because of the hardships encountered during their early training. To answer our correspondent briefly, we say apply to some manufacturing jeweler, almost any of whom will be glad to obtain the services of an intelligent and ambitious young man.—ED.]

DEEDS NOT WORDS WANTED.

To the Editor of the Jewelers' Circular:

I read with much interest the communications that appear in your columns each month, and wish more of the members of the trade would write their experience or ventilate their grievances. When I read these letters I feel just as though I was holding a conversation with a fellow tradesman, and often find myself commenting on the letters as if I were talking to the writer. I have read all that has been said about manufacturers and jobbers protecting the retail trade, but I should have more faith in their professions if I did not know that some of those who talk the most are cutting our throats at every opportunity. Not a week ago I found in the hands of one of our dry goods merchants a catalogue and price list combined, precisely similar to one that had been sent to me, with a circular stating that this catalogue was sent to the trade only. The trade of the dry goods man was solicited on precisely the same terms mine was, and every facility for buying that was offered to me was also offered to him. The man who sent out that catalogue persists in declaring that he never sells to outsiders, and yet I know that I have to compete with his goods in the hands of persons who are not in the trade, but who simply carry a line of cheap jewelry to attract custom, not expecting to make a profit on it, as I must do if I hope to get an honest living. These outsiders make "leaders" of the jewelry they carry, and are willing to sell at cost if necessary, making their profit on other things. We have no such resource; we must make our profit on jewelry or go without it. Yet this man who encourages another to undersell me and destroy my market, expects me to pay my bills to him with the utmost promptness, dollar for dollar. I know three persons in this place who visited New York last fall, each of whom bought a watch while there. I was just curious enough to ask them who they bought them of, and they gave me the names of two well known jobbers, from one of whom I have bought many goods in the past. The prices these persons paid for their watches were quite as low as I could have bought them. One of them said to me: "It pays to go to New York, for I saved the price of the trip on the goods I bought." It was fun for him but pretty rough on me. I

like to hear these virtuous jobbers talk, but I wish their practices were in better keeping with their preaching. I do not see any way to bring to their senses these men who are ready to sacrifice the retail trade any time but to "boycott" them, as is being done in some of the trades. If every retail dealer would refuse to buy goods from any jobber who is guilty of these cutthroat transactions, they would soon be brought to their senses. I am glad to see the retail dealers organizing for mutual protection; we may well take a few lessons from the car drivers, the Knights of Labor and other organizations of that kind; they have shown that perfect organization is all that is necessary to enforce any reasonable demand. With a strong national organization of retail dealers, the jobbers could be taught that we have some rights that even they would have to respect.

L. M. G.

Ohio, March 15.

THE HALF-HOLIDAY MOVEMENT.

To the Editor of the Jewelers' Circular:

I am pleased to see that you favor the movement now on foot intended to secure the closing of all places of business on Saturday afternoons, and thus securing for the thousands of clerks, bookkeepers and others, a much needed rest. I belong to the great army of salesmen, and only those who are or have been similarly employed know how monotonous and tiresome our labor is. It is not the hard work that kills, but the persistent traveling over the same course day after day, with no variety or change. We start in a rut and there we stay from one week's end to another, doing the same things over and over, showing goods to customers, putting them back again, keeping them in order, and waiting and watching for customers. I have no complaints to make of my employers; they are as considerate as circumstances will permit, never ask anything unreasonable, and give me such compensation as such service as I render will command in a market overstocked with labor of all kinds. All that I complain of is the wearing monotony of the life of a salesman. I get so nervous sometimes that it seems as if I could not stand it, but would be forced to sieze my hat and rush into the street for a change of air and scene. Our bookkeeper tells me he is affected the same way, getting so tired of the monotony of his work that he feels as if he were going crazy. A half holiday every week would be a great relief to men of my class, and I am confident that it would entail no loss on our employers.

We cannot expect that a few will close their places on Saturday afternoons while their neighbors keep open; that would be asking an unreasonable thing of them; the closing must be general to be acceptable to employers, and that is what the friends of the movement are seeking to secure. They are laboring with the outside public to persuade buyers to make their purchases at some other time than Saturday afternoon. The solution of the question rests with the shoppers rather than with the proprietors of stores, for if they can be assured that there will be no buyers they will be only too glad to close their places of business. The clergy and the press have done good work in this matter, having influenced thousands of persons to agree not to make purchases on Saturday afternoons, and the prospect is good for having the movement attended with success. Every person interested in the matter should do all in his power to induce his friends to agree to make no purchases Saturday afternoons and the half holiday will follow as a natural consequence, for if there are no buyers there will be no occasion for keeping the stores open. I hope every employee in the jewelry trade will make it his business to induce at least one person to promise not to make any purchases Saturday afternoons; if each will secure one pledge of this kind it will help materially. It is hoped that there will be pledges enough secured so that the early closing movement will go into effect during the present month, and we should all do what we can to make the new departure a permanent reform.

MAIDEN LANE.

New York, March 18, 1886.

AN APPRECIATIVE FRIEND.

To the Editor of the Jewelers' Circular:

I hand you enclosed a postal order for the renewal of my subscription. I began taking the paper about ten years ago, and a short time since I had an opportunity to buy all the back volumes from the very first, and regard them as invaluable. But what a wonderful improvement there has been in THE CIRCULAR since it was first launched. From a comparatively little insignificant sheet of a few pages, it has grown to be one of the handsomest magazines in the country. The character of its contents have kept pace with the improvement in its size and appearance, and I can bear testimony to the fact that it has been of the greatest service to me in my business. The instruction I have received in regard to watch repairing has been of the greatest value to me, and is something that I could not have obtained anywhere else. While I have always prized it highly, I am free to say that it never was so good as it has been during the past year. Wishing you all prosperity and long life, I am yours truly,

T. C. G.

St. Louis, Mo., March 15, 1886.

MORE PRICE LISTS TO OUTSIDERS.

To the Editor of the Jewelers' Circular:

I write to ask you what is the standing in the trade of the jobbers whose card I enclose. Hardly a week has elapsed since they began issuing their net price list but what some one not connected with the jewelry trade in the least has pulled out and exhibited to our astonished gaze one of the aforesaid price lists. Sometimes when I have been talking with a customer one of these outsiders has coaxed him one side and shown him his "book." Some months ago I wrote to these jobbers giving them the names of some of the outsiders who had received their list, and among them was the name of a barber who keeps a shop in the hotel. Of course, the jobbers paid no attention to my letter; I did not expect they would, but I wanted to let them know that their tricks on the trade were known to at least one dealer who had been a customer. About a week ago this same barber came into my store and showed me a new price list issued by these same jobbers, giving the reductions in prices, and coolly asked me if they had sent me such a list. This was a case of going abroad to learn the news with a vengeance! I took particular pains to see the envelope this list came in, and found that it came direct from the jobbers themselves. The barber tells me they have written to him several times soliciting his order. He shows these price lists to whoever desires to see them. It is easy to see the injury this does to my trade. I am having affidavits made out by men who have been shown these price lists, and when I get them I shall send copies to every dealer in this vicinity. If upon presentation of legal proof of these facts to you, you will use your influence to expose the methods of these jobbers "that know no law," you will be doing the trade a service.

S. E. S.

Utica, New York, March 20.

[The jobbers whose names are given in this communication are located in Maiden Lane, and, for the credit of the Lane, we are glad to state that they have no particular standing nor is their business very extensive. We would suggest to our correspondent that when he gets his affidavits prepared he should send copies of them to the New York Board of Trade and also to the National Association of Jobbers in American Movements and Cases. This latter organization is pledged to take notice of such tricks provided the offender is a jobber in watches. Cases of this kind show how much good might be done by an organization of manufacturers and jobbers in jewelry.—ED.]

HOW A MICHIGAN DEALER TREATS OUTSIDERS.

To the Editor of the Jewelers' Circular:

I have been reading the letters in your March number, and it makes me smile while I think of my own experience with outsiders

and botches. Why, my dear jewelers, don't you know that you have them "where the hair is short," if you only thought so? If you would only spend as much time trying to make it warm for outsiders and botches as you do in sitting in your lonesome stores kicking, when you die you would have no enemies to forgive for they would all have been starved to death. "H. W." asks, "If the true watch-maker who has been working hundreds of years to bring about what has been done, etc., is to be drowned out by a man who has never worked a day at the trade?" Say, "H. W.!" If you were a whale, would you allow a rat to come into your own element and drown you? If you would, I think the rat would be excusable, don't you? If an outsider puts in a line of the goods you handle, buy the same thing and sell at cost; make it unprofitable for him, and he will quit. No man is doing business for his health. Let me give you a case in point. My neighbor, the hardware man across the street, bought a dozen clocks about a year ago; I heard of it and went into his store to look at a gun—(see ?)—The next week I had an exact duplicate of his stock of clocks, and was offering them at cost. When a customer came in to look for a timepiece and mentioned the bargains at the hardware, I said: "Oh! yes, I have some of those if you want that kind of a clock," and gave him prices. It almost always ended by my selling him another make at a good profit. It is unnecessary to say that the hardware man still has eleven clocks in stock, and calls quite often to sell them to me at cost. But I say: "Oh! no," you paid too much for them. I am selling for what you paid. Take off 20 per cent. and I'll take them." I'll get them yet at those figures, and he won't buy any more either—no money in it you know. I'll bet on a jeweler every time against an outsider, if the jeweler is "up to snuff."

About the botches. They are easy enough. There have been nine here in the past four years. There is only one here now, and he is awful tired.

The catalogue nuisance is the worst. Every jeweler ought to make a protective association of himself and refuse to patronize firms that send them outside the trade, and the thing will work out its own solution. It will not pay to make large expensive catalogues for outside trade alone. I don't blame a jobber for selling to an outsider if he buys more goods and is better pay than the jeweler, for then it becomes a question which is the jeweler? I'll write again some time if this don't get me into trouble.

W. E. W.

Michigan, March 18.

To the Editor of the Jewelers' Circular:

I am a subscriber to and a close reader of THE CIRCULAR. Am in the retail jewelry business; have been in business more than twenty years, never had a fire, never have failed, always paid one hundred cents to every dollar. I have read with much interest the many articles in THE CIRCULAR, *pro* and *con*, written by both retailer and manufacturer of jewelry. I side altogether with the retailer; to show the craft why I will quote a few facts, and I could fill every page in THE CIRCULAR with the same matter. Last fall a lady came to my establishment; asked to see me; one of my clerks told her I was very busy in the workshop. She sent word to me she only wanted to see me a few minutes, and I went in the salesroom. She, the lady, fetched out of her satchel a paper with squares laid out for advertisements. Would I give her a card to help her church along, as her church was going to hold a fair to raise money; the advertisement would only cost \$5? After a few minutes talk, I saw if I did not give her the advertisement she would be displeased, so I gave her the card and the \$5 and away she went much pleased, and I went back to my shop to finish the job.

There is a jewelry manufacturer in this city that I have purchased \$2,500 of jewelry from in the past eighteen months and paid for same. During the last holidays the above lady whom I paid the \$5 to purchased a diamond brooch. Did she come to me? No, she did not come near me, but went to the jewelry manufacturer who I

paid the \$2,500 to, and she purchased from him and he sold her the brooch.

Last week an agent who travels for a silver jewelry house came to me to sell me what he could, and while I was picking out a line of silver jewelry I saw a pretty silver pin. I asked him the price, he told me two dollars. I told him that was a big price as the thing would not weigh over 10 pennyweights. I put the same in the scales and it weighed 9 pennyweights, 15 grains. I told the agent at that rate the maker made more than the retailer, and he, the drummer, had the cheek to tell me the maker ought to make more to make up for the losses by failures. I ask is it right, is it justice, is it honest, to ask me to pay for the dead beat who starts out in the first place and intends to pay 10, 20 or 30 cents on the dollar, and less if he can.

I don't wonder the retailers and the manufacturers are at loggerheads, and the manufacturers have brought the trouble on themselves by wanting to sell as manufacturers, as jobbers and as retailers. I have more to say in the near future.

FAIR PLAY.

March 16.

The Jewelers' Security Alliance.

President, DAVID C. DODD, JR.

First Vice-President, AUGUSTUS K. SLOAN.....Of Carter, Sloan & Co.
 Second Vice-President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
 Third Vice-President, DAVID UNTERMAYER.....Of Keller & Untermeyer.
 Treasurer, W. C. KIMBALL.....Of H. F. Barrows & Co.
 Secretary, C. C. CHAMPENOIS.....Of Champenois & Co.

EXECUTIVE COMMITTEE.

C. G. ALFORD, *Chairman*.....Of C. G. Alford & Co.
 J. B. BOWDEN.....Of J. B. Bowden & Co.
 GEO. W. PARKS.....With E. I. Franklin & Co.
 J. T. SCOTT.....Of J. T. Scott & Co.
 N. H. WHITE.....Of N. H. White.
 CHAS. G. LEWIS.....Of Randel, Baremore & Billings.

EXAMINING FINANCE COMMITTEE.

JOS. STERN.....Of Stern & Stern.
 CHAS. F. WOOD.....Of Chas. F. Wood.

Counsel, HON. ALGERNON S. SULLIVAN.

For further information, Application Blanks for Membership, By-Laws, etc., Address P. O. Box 3277. 170 Broadway, New York.

A meeting of the Executive Committee was held at the Alliance office on Friday, the 12th inst., attended by President Dodd, Vice-Presidents Sloan, Hayes and Untermeyer, Treasurer Kimball, and Messrs. Alford, White and Secretary Champenois.

Applications for membership were received from the following firms, who were admitted into the Alliance:

Chas. W. Freeman, Scranton, Pa.; R. & L. Friedlander, New York City; A. J. Hood, Brick Church, N. J.; Merry & McVitty, Norwalk, Ohio; M. C. Motch, Covington, Ky.; Theo. F. Rude, Cuba, N. Y.; C. W. Skiff, Westfield, Mass.

Gossip of the Month.

THE Broadway railroad steal promises to bring a good many persons to grief. There are the Aldermen who received bribes to grant the franchise to the railroad company, the men who paid the bribes, and the Philadelphia capitalists who, after the investigation began, bought the road in the belief that, as they were third parties, they would be regarded as innocent purchasers, but the transaction is so transparent that it will scarcely be sustained by the courts. Nevertheless, the experiment has demonstrated that a road in Broadway is a necessity; it has been running but a short time, but we doubt if there is a single resident of the city who would like to see it removed and the street cars replaced by the lumbering, awkward and inconvenient old stages that were tolerated so many years after their usefulness had passed. The probability is that the Legislature

will annul the existing charter, and authorize the Mayor to sell the franchise to the highest bidder. If this is done, the city will realize several millions of dollars for privileges that the Aldermen sold for their own private gain for a comparatively trifling sum. Whatever may be the outcome of the investigation, the business men of the city cannot dispense with a railroad in Broadway.

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THAT was a plucky express messenger out West who was killed in his car recently by robbers while defending the treasure committed to his care. The robbers forced their way into the car, killed the messenger, robbed the safe and escaped with booty amounting to \$20,000 or \$30,000. When the train reached the next station the tragedy that had been enacted was discovered, with evidence that the messenger had made a most desperate resistance. Among the property secured by the robbers and murderers were several packages reported to contain jewelry. The messenger died like a hero, and the express company should see that the wife and children who are thus deprived of their natural protector are properly provided for during their lives. An appeal to the business community would meet with a hearty response from men who are quick to recognize a fidelity that is true to the death. The messenger could have saved his life, no doubt, if he had consented to surrender the keys of the safe, but he preferred to lose his life defending them. Such fidelity is deserving of a public monument.

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SPEAKING of monuments, the American people do not seem to take very kindly to monumental methods for spending their money. The attempt to raise a large and apparently unnecessary sum for a pedestal for the Bartholdi statue has been prosecuted with vigor for several years, yet the desired amount has not been secured, but the failure to do so has made the committee having the matter in hand a laughing stock, and the liberality of New Yorkers a by-word. The subscriptions to the Grant monument fund have not yet reached \$120,000, although the very extensive committee selected was confident of securing a million dollars in almost no time. The trouble with both these schemes is that their promoters had altogether too enlarged ideas; they wanted the whole earth and the fullness thereof, and a mortgage on the universe besides. The statue of Liberty Enlightening the World is a good thing to have, but hardly worth the price the people have been asked to pay for it; a monument to General Grant is something everybody will be glad to see erected, but no sane person would approve of paying a million of dollars for it. General Grant's memory is dear to every American citizen, but American citizens are too utilitarian in their ideas to put so much money into a structure that can serve no useful purpose. The appeal in behalf of General Hancock's widow was more promptly responded to, because it was more modest, and was for a benevolent purpose that every one could comprehend. If the Grant monument committee expects ever to complete its work, it will have to reduce its estimates and submit its plans to public approval. The public will not send in its money blindly, but when plans for a monument have been secured, the money will be forthcoming to build it, provided the cost is kept within reasonable limits. The American people are so decidedly practical that they do not approve of large expenditures for purely ornamental purposes.

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THE freight blockade in the West, caused by the strike of railroad employees, wrought great hardship to the merchants of St. Louis and other western cities on the lines of the roads involved in the contro-

versy. For many days not a pound of freight was permitted to pass through St. Louis either way, and thousands of freight cars were side tracked in the freight yards and in the suburbs of the city. Roads that had given no offence to the strikers were obstructed, because, in order to move their trains, they were compelled to use for a short distance the track of the road that had caused the strike. Business in St. Louis almost came to a standstill, merchants being unable to either receive or send out goods, and their country customers were turned in other directions. The loss of trade to that city was immense, and there are apprehensions that the loss is a permanent one, for trade once diverted is difficult to recover. Other cities that have had the benefit of this increased trade temporarily will use their utmost endeavors to retain it, and St. Louis is sure to be a loser to a considerable extent. Cities further West and South suffered even more severely, comparatively speaking, for competition between rival places is more active, and the ones that were not disturbed by the strike are likely to be permanent gainers by this diversion of trade. Chicago merchants are reported to have felt the effects of the blockade considerably, and to have experienced a considerable falling off in the volume of their business; even in this city there was a perceptible shrinkage in orders from the West and Southwest. Merchants were reluctant to order goods that were liable to be tied up if not lost in a railroad blockade; indeed, one dealer in the trade told us that he had orders for goods that he would not ship, being unwilling to take the risk of their being lost or possibly destroyed by some outbreak of the strikers. The great railroad strike at Pittsburg a few years ago, when the freight buildings and much freight were burned, are still fresh in the minds of the public, and a repetition of these disturbances is always possible when strikes of railroad employees assume such magnitude as they did then or have now. What is to be the outcome of these labor demonstrations it is impossible to predict, but that they seriously disturb the business of the country is painfully evident. Many think that it is the duty of Congress to pass laws that will prevent interference with the transportation facilities of the country, but it is difficult to see how Congress can compel laboring men to work against their will, or make railroad trains to run without men to operate them. The labor problem is one of great magnitude, and its solution will require the exercise eventually of the highest wisdom the country can command, and the greatest patience on the part of the people, lest what is now the protest of labor against the tyranny of capital take on the form of communism, and devote itself to the destruction of property, and, possibly, of life.

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THE lenses for the largest refracting telescope in the world are now being completed in the workshops of Mr. Alvin Clark, the eminent telescope maker, in Cambridgeport, Mass. This telescope is being made for the Lick Observatory, of California. The two circular disks of glass that go to make the lens, are said to be worth \$25,000 each, and if they should be destroyed in the finishing processes, they could not be duplicated under many months. They were cast in Paris, the order having been given five years ago, but the failures in casting them were so numerous that they were only received by Mr. Clark in September last. When finished the lens will be thirty-six inches in diameter, six inches wider than the one he recently finished for the Russian government. Since receiving the disks Mr. Clark and his sons have been constantly at work upon them, but do not expect to have them completed much before fall. These two lenses weigh about 700 pounds. The work of polishing them has now reached that stage when the removal of a few grains of glass too much in one place would ruin them. The polishing is done by rubbing with the hand, upon which rouge is smeared, thus forming a polishing substance finer than the finest emery. Some idea of the power of these lenses may be formed from the statement

of an astronomer, who says that gazing at the moon, 240,000 miles away, through this telescope, that xxxx orb will be brought to within less than one hundred miles of the observer. The Lick Observatory is located on the peak of Mt. Hamilton, and is a bequest to California by James Lick. Mr. Clark, the veteran telescope maker, whose success in the production of lenses is unrivalled, is now eighty-two years of age, and on the 25th of March last he and his wife celebrated the sixtieth anniversary of their marriage.

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THERE is a dealer in the Lane who is somewhat noted as a joker : he has a salesman who has been with him a great many years, and who is also fond of a joke. These two often measure wit together, and nothing will please either more than to get the best of the other in repartee. About the first of January the salesman thought he ought to have an increase of salary, and delicately broached the subject to his employer. He is a single man, but contrives to spend all he can earn. On this occasion he represented that he must have more salary to enable him to live. "Why, it costs me \$2,500 a year just for living expenses," he said. "Too much, Charley, said the other, "too much altogether ; it ain't worth it— it's a great waste of money. Stop living and save it." We still see Charley on the street, but whether he got the raise or not he does not say.

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IN our March issue we made mention of the terrible bereavement that had befallen Professor Waldo in the loss of his wife, under peculiarly distressing circumstances. He writes us that he has been directed to take a trip to Europe for a few weeks for his health, and will continue his contributions to our columns from abroad. Our readers will miss his valuable papers, but under the circumstances will, we are sure, bear the deprivation patiently. We hope to hear from him next month, and certainly not later than our June issue.

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BY the time this number of THE CIRCULAR reaches our readers we hope to be settled in our new offices, No. 189 Broadway. The building where we have had headquarters so many years has been made almost untenable by the encroachment of ambitious neighbors, who have erected a modern high office building alongside of it that towers heavenward. Our new location is central for the trade, and our offices are finished off in a convenient and desirable manner. We shall have better facilities for receiving our friends, and we extend a cordial invitation to one and all to give us a call. Dealers from out of town are especially urged to drop in on us when in the city, and we will do what we can to facilitate their business and promote their comfort.

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WHEN burglars, sneak thieves and New York Aldermen are loose in the community, it behooves every honest man to look carefully after his pocketbook and other portable property. We have frequently called attention to the advantages offered jewelers by the Jewelers' Security Alliance, which has done so much to bring to justice thieves who made a specialty of robbing jewelers. The thieving fraternity has been taught a most wholesome respect for the membership certificates of the Alliance, and where one of these is displayed in a jewelry store, the thieves are wont to pass by and seek other opportunities for practicing their depredations. The object of the Alliance is to punish thieves who rob its members, and

when a loss is reported, the best detectives in the country are selected to hunt down the criminals and recover the stolen property. So energetic have the officers been that a long time has elapsed since a member was robbed. The Alliance, it should be remembered, bears all the cost of this work, and can afford to spend money more freely to accomplish its object than any individual who has just been robbed will feel inclined to do. The cost of membership is so trifling that no retail dealer ought to hesitate a moment about joining—the question is not "can I afford to join," but "can I afford not to join." The criminal classes are recruiting rapidly, and honest men are required to adopt every practical safeguard for the protection of their property, and among the best in the jewelry trade is the Safety Alliance.

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THE sinking of the Cunard steamship *Oregon*, off Fire Island, on the morning of March 14, was one of those mysterious events that come occasionally to startle the whole civilized world. In the clear starlight of early morning, when within a few hours of her destination, she was run into by a schooner, which sank with all on board almost immediately. The iron hull of the *Oregon* was broken in, and the water rushed in beyond the possibility of control. Preparations were at once made to leave the sinking ship, and the 900 or more persons on board were transferred to vessels that had come to their assistance. Not a life was lost, or anyone seriously injured. Very soon after the last person left the steamer, she went to the bottom with her valuable cargo. This is the season of the year when our importers are receiving large consignments of goods from their European buyers, and the fastest steamers are selected for conveying the more valuable goods. Several diamond importers had large consignments of precious stones on board the *Oregon*. As is customary these were in the special custody of the purser, and he succeeded in saving them all. An interesting question will be presented as to whether they are to be treated as salvage, or as special deposits in the custody of the purser. A deputy United States Marshall took possession of them at the instance of the North German Lloyds Steamship Co., but they were again released upon the owners filing bonds, and the case will thus come before the United States Courts for adjudication.

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IN December last, a certain lawyer in a prominent southern city, in a spirit of revenge, undertook to impugn the business reputation of a well-known and perfectly solvent jeweler. He ascertained the names of some of the houses in New York with whom the jeweler dealt, and then wrote them letters saying that their customer was insolvent and was selling his goods for whatever he could get and was also putting stock away out of the reach of his creditors. He warned them that if they wished to secure their claims against him they should write to him (the lawyer) at once and he would attend to the business for them. Of course it created quite a stir in this city where the dealer bought largely and where his standing had always been good. Some firms naturally got badly scared, and among them was one of our large diamond houses with whom the jeweler in question had been dealing for about 14 years. They sent one of their agents at once to the gentleman and demanded an immediate settlement of their account, not taking time to inquire into the merits of the case or even regarding the character of the lawyer who had so kindly sent them their information. But as the agent had his explicit instructions from his house, he stuck strictly to the letter of them, and the dealer settled with him at once. Before the New York man had left the city, however, he found out that he had been victimized by the kind favors of the lawyer to the tune of about \$700,

and no doubt his house now mourns the loss. To set matters straight with the balance of the trade (as it was a very serious matter and the first intimation the dealer had of the doings of the lawyer) he immediately proceeded to take an inventory of his stock, real estate, etc., and the sworn report of the same, which he sent on to the New York Jewelers' Board of Trade, showed such a large balance in his favor that comments were unnecessary. The affair was simply one of blackmail on the part of the lawyer, and had not the dealer taken the matter in hand as he did would have given him considerable trouble and annoyance. This is a somewhat unusual case, but similar ones are not unknown to the trade. There are "shyster" lawyers everywhere ready to resort to any means to make money, and levying blackmail is a favorite game for them to play. Had the case of this lawyer been presented to the bar of his city, there is no doubt but he would have been properly punished. We have been furnished with all the names of parties to this transaction, but as no means were taken to punish the guilty person, we are not at liberty to publish them. In a case of this kind, the jewelers should make common cause against the maligner of one of their number, and use the full power of their organizations to secure his punishment.

Sale of the Silverware of the Morgan Collection.



ELSEWHERE we have spoken of the silverware in the famous art collection of Mrs. Mary J. Morgan; appended is a list of the principal articles, together with the prices realized for them. The entire collection of silverware brought only about one half what it cost Mrs. Morgan. Such a wealth of rich goods being thrown on the market all at once, it was hardly to be expected that full prices would be offered for them:

| | |
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| Set individual salts and spoons, shell designs | \$ 120 |
| Tete-a-tete set, "Niello" copper inlaid | 120 |
| Compote, peacock design, repousse | 660 |
| Wine carriage, repousse, ram's-head handle | 140 |
| Set tea pot, sugar, creamer and bowl, repousse | 160 |
| Antique plaque, repousse, "Music and Poetry" | 100 |
| Liqueur flagons, Oriental, repousse | 300 |
| Claret tankard, repousse and chased | 155 |
| Pair wine coolers, tub shaped | 160 |
| Vase, Oriental design | 115 |
| Pair candlesticks, English pattern | 100 |
| English Queen's coin tankard, with inscription | 675 |
| Bureau set, hammered surface | 112 |
| Antique kettle, repousse, chased stand and lamp | 155 |
| Salad dish, oval shape, relief ornament | 137 |
| Pair oval vegetable dishes, flat chased parcel gilt | 140 |
| Oval entree dish to match above | 100 |
| Pair round vegetable dishes to match | 150 |
| Vase, cylindrical, Japanese, repousse, 11 1/2 x 4 1/2 | 100 |
| Square tray, repousse and chased, 12 x 12 | 105 |
| Black coffee pot, repousse undercut | 290 |
| Creamer and sugar bowl to match | 285 |
| Terrapin dish, hammered, water finish | 175 |
| Claret jug, Oriental design, hammered | 115 |
| Antique plaque, diameter 15 1/2 | 120 |
| Center piece, figures and shields in relief, 24 x 15 x 8 | 247 |
| Old English coasters, grapevine pattern, royal crest | 410 |
| Claret jug, walrus shape | 132 |
| Wine cooler, Grecian pattern, repousse chased | 187 |
| Large vase, hammered and repousse, 13 1/2 x 5 1/2 | 140 |
| Tankard, body ivory tusk, dragon handle | 300 |
| Tankard, Indian hunting scenes, repousse | 120 |
| Center dish, for flowers or fruit, repousse, 26 x 16 x 7 | 720 |
| Large plateau to match, mirror in repousse chased, 26 1/2 x 18 | 365 |
| Epergne with dish stand, by Tiffany, 12 3/4 x 30 | 370 |
| Roast beef dish, chrysanthemum pattern, 24 x 17 | 190 |
| Meat dish to match above, 22 x 15 1/2 | 155 |
| Meat dish to match above, 20 x 14 | 145 |
| Meat dish to match above, 18 x 13 | 130 |

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|---|--------|
| Meat dish to match above, 16 x 11 1/2 | \$ 135 |
| Pair Roman dishes to match, diameter 13 inches | 290 |
| Entree dishes to match, oval, 16 1/2 x 9, two pieces | 200 |
| Compote dishes to match, four pieces | 360 |
| Sweetmeat trays to match, four pieces | 160 |
| Salt stands to match, four pieces | 110 |
| Antique plaque, repousse, classical subject, 15 1/2 x 11 1/2 | 105 |
| Tea service, Oriental repousse chased | 2,800 |
| Hot-water kettle to match above | 600 |
| Finger bowls, repousse chased, pierced, gold finished | 675 |
| Plates to match above | 675 |
| Compote dishes, repousse chased, chrysanthemums, pierced, medallions | 320 |
| Center piece, 6 branches, repousse and chased, 48 x 21 x 17 | 825 |
| Ewer and basin, Oriental, repousse, etc | 210 |
| Jar, with cover and top handle to match | 145 |
| Pair candelabra, 12 lights, old English, repousse, 28 in | 820 |
| Pair candelabra, 9 lights, similar to above, 21 in | 345 |
| Russian after-dinner coffee spoons | 330 |
| After-dinner coffee spoons to match | 210 |
| Game knives and forks | 445 |
| Sconces, bold repousse pattern | 160 |
| Candelabra, 6 lights, North American Indians, figures by St. Gaudens, 32 x 17 | 3,500 |
| Antique plaque, round and deep, repousse, chased, dia. 16 | 100 |
| Large wine cooler, Oriental repousse, birds, 8 3/4 x 23 | 200 |
| Pair candelabra, 9 lights, height 21, spread 18 in | 770 |
| Candelabra, Roman design, 20 lights, tall pedestal, 68 x 23 | 8,100 |
| Large group, "The Buffalo Hunt," by R. Monti, 1873, 23 x 25 x 16 | 800 |
| Lamp, silver and other metals, cornucopia | 240 |
| Plaque, repousse and Niello, on stand, diameter 20 | 300 |
| Plaque, repousse, "Night," diameter 13 1/2 | 175 |
| Plaque, "Hen and Chickens," diameter 13 1/2 | 150 |
| Plaque, bowl, repousse, "North American Indian," 15 x 9 3/4 | 175 |

To Recover the Silver from Stonings.



THE SILVER contained in the stonings of large silversmith establishments is quite important, and most assuredly worth the trouble of the foreman or superintendent to see that the metal is all recovered. We will, at this early stage, say that it can be effected simply with nitric acid; but that this manner of recovering is the best and most reliable of all is doubtful, and can easily be tried by the party interested.

We have seen very little published on this subject—we mean, of course, anything reliable, and, in fact, we have invariably seen this important subject treated with a certain superficiality. It is of very little assistance to the silversmith to read in random publications that the silver may be recovered from stonings by the use of nitric acid if it is not stated how much of each shall be taken, or how he shall go to work to recover it. The writer has purposely experimented on this subject, and the following is the result:

The stoning is from time to time taken out of the vessel used for the purpose, and passed through a small-holed wire sieve into another vessel, half filled with water; in this manner the pieces of pumice stone, coal and blue stone are kept back. The sediment is left to stand over night in this second vessel; next morning the supernatant water is poured off; some of the lighter, black deposit may also pass away; let it go, as it contains no silver. If it is summer the stoning is set out in the sun to dry; if winter it is to be dried with artificial heat. When thoroughly dry it is glow-heated in appropriate pans; this process is to be recommended, because the mass becomes very concentrated thereby. Then take for each 6 pounds stonings 3 1/2 pounds pure nitric acid, of the usual strength. The stonings are placed into a large stone or earthenware vessel, which fill not higher than barely one-half; pour upon the former the indicated weight of nitric acid, and cover the vessel.

After twenty-four hours pour in sufficient soft hot water that the stonings are reduced to a thin paste. The vessel is left in this cor-

dition until the yellow vapors cease to evolve; when this has occurred more hot water is poured in until the vessel is full. When the stoning has deposited again, and the water is clear, it is carefully decanted into another spacious vessel, in which, subsequently, the precipitating with copper is performed. The stoning is washed three or four times, in fact, until it contains no trace of silver, which can be recognized by throwing from time to time, during the process of washing, a few grains of salt into the clear water; after the sediment has deposited, if the salt dissolves without a white cloud it may be presumed that all the silver has been washed out. The first and second decantings, which contain the largest quantities of silver, are poured together, and the latter is precipitated with copper. It is advisable to take long strips of copper for this purpose, they being more commodious, as they can be simply set in the vessel, and the process of the crystallization of the silver can be better observed, cleaning them from time to time; if these are wanting, however, take a sheet of copper, perforate it in suitable places, draw a cord through, tie this to a piece of wood, and suspend the plate in the fluid, laying the piece of wood across the vessel.

As was previously said, the first and second decantings contain the greatest amount of silver, which is precipitated with copper, the process being finished in twenty-four hours. The water over this silver is poured off, and the latter washed a few times with warm water. Although the greatest quantity of the silver has been obtained in this manner, still the other wash-waters also contain a small percentage; but the copper-precipitating process would be too slow, and common table salt is used. The stoning is still a few times washed with warm water, until the few grains of salt thrown in show no cloudiness whatever. Do not hurry the operation. Throw a quantity of salt into the collected wash-waters, stir them well, and let stand for twelve hours. A white deposit, chloride of silver, or horn silver, will have collected on the bottom, and the water have become clarified. The process may then be regarded as finished; still, for the sake of satisfying yourself that you have all the silver, throw in a few more grains of salt. If the water remains clear, you may throw it away, as well as the stoning. The reduction into metallic silver is known to every silversmith.

The Nobility of Goldsmith's Work.



THE following beautiful paragraphs are extracts from a series of lectures delivered in Europe years ago, and those of our readers who are gold and silversmiths will agree with us in saying that times have not changed any since then.

"The first idea of a rich young couple setting up house is that they must have new plate. Their father's plate may be very handsome, but the fashion is changed. They will have a new service from the leading manufacturer, and the old plate, except a few Apostle spoons, and a cup which Charles the Second drank a health in to their pretty ancestress, is sent to be melted down, and made up with new flourishes and fresh luster. Now so long as this is the case—so long, observe, as fashion has influence on the manufacture of plate—so long you cannot have a goldsmith's work in this country. Do you suppose any workman, worthy the name, will put his brains into a cup or an urn, which he knows is to go to the melting pot in a half-a-score of years? He will not; you don't ask or expect it of him. You ask of him nothing but a little quick handicraft—a clever twist of a handle here, and a foot there; a convolvulus from the rarest school of design; a pheasant from Landseer's game cards; a couple of sentimental figures for supporters, in the style of insurance offices; then a clever touch with the burnisher, and there's your epergne, the admiration of all the footmen at the wedding breakfast,

and the torment of some unfortunate youth who cannot see the pretty girl opposite to him through its tyrannous branches.

"But you don't suppose that *that's* goldsmith work? Goldsmith's work is made to last, and made with the man's whole heart and soul in it; true goldsmith's work, when it exists, is generally the means of education of the greatest painters and sculptors of the day. Francia was a goldsmith; Francia was not his own name, but that of his master the jeweler; and he signed his pictures almost always, 'Francia the goldsmith,' for the love of his master. Ghirlandajo was a goldsmith, and was the master of Michael Angelo; Verocechio was a goldsmith, and was the master of Leonardo da Vinci. Ghiberti was a goldsmith, and beat out the bronze gates which Michael Angelo said might serve for the gates of paradise. But if ever you want work like theirs again, you must keep it, though it should have the misfortune to become old-fashioned. You must not break it up nor melt it any more; there is no economy in that; you could not easily waste intellect more grievously. Nature may melt her goldsmith's work every sunset, if she chooses, and beat it out into chased bars again at every sun-rise, but you must not. The way to have a truly noble service of plate, is to keep adding to it, not melting it. At every marriage, and at every birth, get a new piece of silver, if you will, but with noble workmanship on it, done for all time, and put it among your treasures; that is one of the chief things which gold was made for, and made incorruptible for. When we know a little more of political economy, we shall find that none but partially savage nations need, imperatively, gold for their currency; but gold has been given us, among other things, that we might put beautiful work into its imperishable splendor, and that the artists who have the most wilful fancies may have a material which will drag out, and beat out, as their dreams require, and will hold itself together with fantastic tenacity, whatever rare and delicate service they set it upon.

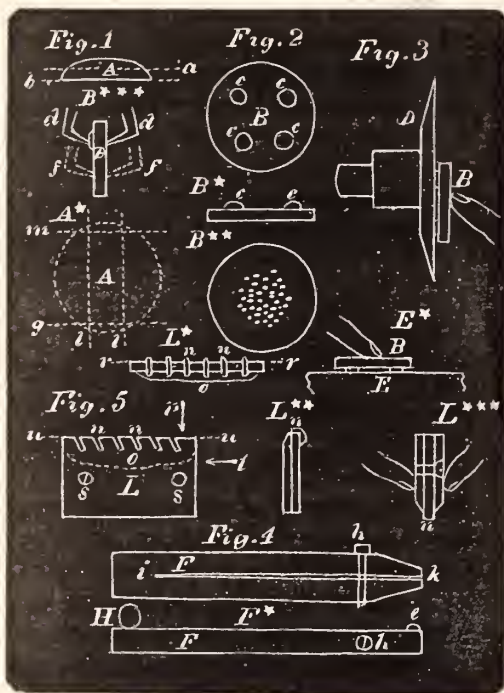
Problems in the Detached Lever Escapement.

BY DETENT.



AS WAS promised in last article, I shall proceed to describe how to prepare and grind a dozen or more pallet stones. Procure a gross of as large cap jewels as can be obtained, and be sure they are real stones, not glass imitations. A word or two on cap jewels: No glass imitations should ever be used; they may work nice enough at first, but after a short time they will commence to cut and then there will be trouble; the watch will fall off in motion when the balance is in position to rest on this end stone. It is very common in the cheaper grades of Swiss watches to find glass imitation ruby cap jewels; this is, no doubt, done to deceive the customer by the idea of a fine ruby jewel. To be sure they are cheaper, but the best garnet caps only cost about 20 cents a gross in Switzerland, and surely the cost should not excuse their use. When you find a glass end stone in a watch "*fire it out*," as the boys say. And the same may be said of glass ruby or jewel pins. To determine real garnet end stones is not so easy at the present time, for the writer has seen (sorry to say bought) some which had the right color but still were glass, and poor glass at that. Fasten one or two of a sample lot to something with shellac and test with a file. It will require a good sized cap jewel for the largest size of pallet stone, but they can be got by watching out a little. A great essential in preparing pallet stones is something to measure the exact thickness of each stone. One of Grossmann's gauges is an excellent tool but they are expensive; but one of the ordinary snap gauges if carefully—by carefully here, I mean used so as to judge and determine the measurements with the greatest accuracy. The flat side of good cap jewels is nicely polished; and now what we want is to grind off the convex side to a flat plane as shown in fig. 1, where the dotted line *b* represents the

already ground and polished flat face, and the dotted line *a* the surface to be ground. At *B*, fig. 2, is shown a disc of sheet brass (say No. 14); this disc should be about $\frac{3}{8}$ of an inch in diameter; to this should be attached with shellac 3 or 4 cap jewels as shown at *c c c*. This disc *B*, with the cap jewels *c*, are held against the diamond lap *D*, fig. 3, by pressing the forefinger against the back of the disc as shown (in fig. 3). To enable the finger to securely hold the disc, the back of the disc *B* is cut into rasp teeth with a graver as shown in diagram *B***. The proper thickness can be determined by the snap gauge, as shown in diagram *B**** where *d d* represent the jaws of the snap gauge and *B* the disc and jewels. The measure or thickness of the jewel is ascertained by comparing the reading of the gauge when measuring the jewel and brass disc as shown at *d*, and again measuring the brass disc only as shown at the dotted outlines *f*. If a dozen pallets are to be made, divide them into 3 lots of 4 each and cement them with shellac on to the disc *B* as shown in fig. 2. The diamond lap will soon flatten the jewels to the proper thickness. Next comes the polishing; this can, in this case, be the best effected by using your ground glass lap so often described in these pages; but for the benefit of those who are recent subscribers I would say, it is simply a piece of heavy plate glass roughened by grinding with fine emery and water. The glass is supplied with fine rotten stone



or tripoli and water, and the disc *B* is applied to the ground glass slab or lap *E* as shown in diagram *E*. The disc *B* is pushed about on *E* in all directions, until the rotten stone and water has perfectly polished the surface of the cap jewels. We next remove the jewels from the disc and repeat the operation until we have 12 jewels of trifling different thicknesses. Our next care is to grind off one edge of the flat discs of garnet as shown at the dotted line *g*, diagram *A**. This edge is the one which goes into the bottom of the slot in the pallet, and in grinding off no more should be removed than just to square off what will be the back end of the pallet. This ground off end need not be polished but left just as it comes from the diamond lap. The question now comes up of how is the best way to hold the jewel while it is being ground at the back. The writer has found about the best way was to grind off this back edge singly or one at a time by clamping in wooden jaws as shown in fig. 4. This clamp is made of a piece of boxwood $2\frac{1}{2}$ inches long, $\frac{3}{8}$ of an inch wide, $\frac{1}{8}$ thick and shaped as shown. Diagram *F** is an edge view of *F*, fig. 4, seen edgewise or in the direction of the arrow *j*. The boxwood piece *F* is slotted with a saw at *i* which serves to make a pair of jaws at *k*; these jaws are drawn together by the screw *h*. The jewel is held between the jaws as shown at *c*, diagram *F**. The boxwood

jaws *F* can be rested against a piece of large wire set in the tool post of the lathe as shown at *H*, diagram *F**. We have now got our slips with two polished flat sides and one edge (in *g*, diagram *A**); and next comes grinding and polishing the sides or edges of the pallet stones corresponding to the lines *ll*, diagram *A**. To do this, take a piece of hard No. 24 brass shaped as shown at *L*, fig. 5; this piece (*L*) should be about $\frac{1}{2} \times \frac{3}{4}$ of an inch, and in one edge cut carefully six notches as shown at *n*; these notches are to hold one-half of your dozen pallet stones, and after they are inserted they should not leave the piece (*L*) until complete, *i. e.*, ground and polished on each side and also the impulse face. Diagram *L** is an edge view of *L*, fig. 5, seen in the direction of the arrow *p*. In this diagram (*L**) the slips of garnet are shown as inserted into the notches *n n* of fig. 5. The manner of proceeding is to cement the slips into these notches with the square edge ground with fig. 4 at the bottom of the notch. We have to guard against the slips of garnet turning to one side by the action of the diamond lap; to prevent this we commence by putting an extra amount of cement (shellac) on one side of *L* as shown at the dotted line *o*, diagram *L**; this will prevent the stone being forced out on that side, as we commence by grinding on the opposite side, corresponding to the dotted line *r*; we should grind this side down to near the brass on the diamond lap, and finally polish on the glass slab with rotten stone and water. In order to secure the garnet slips from being forced out while we are grinding the opposite edges which is enclosed in the cement at *o*, we fasten by 2 screws a brass plate of the same size and thickness as *L* to the side we have just ground and polished. This will be better understood by inspecting diagram *L*** which is an end view of fig. 5 seen in the direction of the arrow *l*. These two plates are held together by the screws *s s*, fig. 5, and diagram *L***. We can grind off the wax or cement at *o*, and also the edges of the slips of garnet until we bring them down to the right width, when we can repeat the process described above for polishing the other side on the glass slab. We now come to grinding and polishing the impulse face; to better secure the slips of garnet, another piece, as shown in diagram *L****, can be added. This arrangement forms, in fact, a pair of brass jaws between which the pallet stones are held. The notches in *L*, fig. 5, are cut obliquely to correspond to the face of the impulse angle. Now, all we have to do is to grind off the exposed part of the stones to bring them parallel to the line *u* and we have the proper angle. Of course, it is understood that the angle of the notches *n* vary for entrance or egress pallets. By taking the clamp shown in diagram *L**** between the thumb and forefinger and rocking it back and forth, the impulse face can be rounded up both in grinding and polishing. One advantage of this system is the diamond lap can be dispensed with, using only emery and rotten stone, as will be explained in our next article.

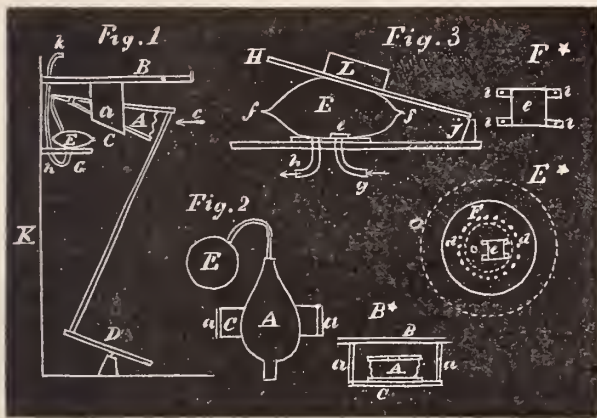
Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



THE SOLDERING and repairing of spectacles and eye-glasses are matters of first-class importance in a jewelry store and should receive due consideration; and, as steel frames form the greater portion of our jobs in this line, we will first consider these. For all jobs where hard solder is used, my advice is to use gold solder of about 12 karat; it is much stronger than either silver solder or brass, and the cost of the solder is mere nothing. A mechanical blowpipe of some kind is the thing for spectacle jobs, as it allows of using both hands to hold the work. We have several mechanical blowpipes in the market; Burgess' is the best, but it costs \$10. Another form is called the *foot blower*, costing \$4; but to this must be added a compound blowpipe, costing \$3.50, making this also expensive. But the

writer considers the convenience of a self-acting blowpipe of such importance that he will devote this article to the description of one cheaply and easily made. To those who can afford it I would say buy a Burgess, but I know many of my young readers cannot well spare the money, and, moreover, many, if not most, watchmakers like tools and conveniences of their own construction. Such a self-acting blowpipe as I am describing is ample to do the very heaviest of hard solder jobs, and will also be sufficient to melt an ounce of gold on charcoal. Let us say no more in its praise, but I guarantee any person who makes and uses one will not part with it for four times its cost; the expenses to be incurred for making one is a cheap pair of hand bellows, 3 or 4 feet of rubber tubing, a few inches of $\frac{3}{8}$ brass tube. The hand bellows are mounted underneath the work bench well out of the way, as shown in fig. 1, where *B* represents the bench and *A* the hand bellows in vertical section at right angles to the front of the bench. The bellows *A* are mounted on a small shelf at *C*; this shelf being held in position by the brackets *a a*, diagram *B**, which is a front view of the bellows seen in the direction of the arrow *c*, fig. 1. At *b*, fig. 1, is shown a spiral spring which serves to keep the bellows open by raising the upper lid. The objection to the use of such bellows for blowpipe use is the intermittent blast; to remedy this we will have recourse to a device shown at *E*, fig. 2. This device is also mounted on a shelf below the bench, only this shelf is set horizontally instead of inclined as the one on which the bellows (*A*) are mounted. The constant pressure bag *E* is made of two discs of sheep skin, such as is used for shoe linings. These discs should be



about 10 inches in diameter, and are to be ultimately joined by sewing the outer edges together, as* will be explained further along. A piece of pine board (*F*) $\frac{1}{2}$ inch thick and six inches in diameter is next provided; into this is fitted the tubes which convey the air from the bellows and to the blowpipe. At *F*, diagram *E**, is shown the circular piece of board in full outline while the dotted lines show the lower leather disc; this lower leather disc has a hole in the middle 2 inches in diameter, as shown at dotted outline *d*, diagram *E**; through this hole the air connections are made. In making, the lower leather disc is tacked to *F* by a ring of tacks indicated at the larger dots at *d d*, diagram *E**. At fig. 3 is shown a vertical section of the air bag *E** as it appears in actual use. To illustrate, we will suppose the two discs of *E* are sewn together at the edges, as shown at *f f*, and the lower leather disc securely and tightly attached to the board *F*; a tube *g* inserted into (and through) the board *F*; if, now, we should blow through the tube *g*, the bag *E* would be distended as shown in fig. 3. And again, should we insert another tube as at *h*, fig. 3, the air in the bag *E* would pass out as indicated by the arrow shown in the tube *h*. Now, as the passage or current of air from the bellows *A* is intermittent, not only when the bellows *A* are being filled would there be no more air thrown into *E*, but there would actually be a portion sucked out; consequently, we must close the ingress tube *g* with a valve as shown at *c*, which closes as soon as there is any tendency of the air to pass back through the

tube *g*. This valve is very simple, being composed of a bit of thin ($\frac{1}{8}$) wood about $\frac{1}{2}$ or $\frac{3}{4}$ of an inch square, faced with very light, thin chamois skin. The chamois skin has 4 pieces, *i i i i*, left projecting beyond the block *c* (on diagram *F**) to be tacked to *F* to keep *c* in place. The block *c* is attached to the chamois skin with glue. The projections *i i* are tacked to *F*. Now, it will be seen that the air forced by the bellows *A* through the tube *g* will rise the light valve *c*, enter the bag *E* and pass out through *h* to the blowpipe. If, now, we attach the wooden disc *F* to the shelf *G*, fig. 1, and the shelf *G* to a bracket attached to the back support *K* of the bench *B*, we have all our parts in a secure position. We want to now arrange our pressure on the bag *E* to ensure a constant and even blast from the tube *h*. If we conceive fig. 3 to be a front view of *E*, as seen in the direction of the arrow *c*, fig. 1, *G* will represent the edge of the shelf to which the disc *F* is attached, we can readily understand how a perfectly even air pressure is obtained. At *H* is shown the edge of a piece of thin board 15 inches long, 8 inches wide, hinged to a stud on the shelf *G* at *j*. We next apply a suitable weight as shown at *L*, to the board *H*, when, by changing the position of *L*, we can obtain just such a pressure on *E* as we desire, or we can make *L* a box into which we put bits of iron to weight it as we desire. It will be understood on inspection as the air is forced into *E*, *H* and *L* will rise; and when we open the bellows *A* for a fresh supply, the valve *c* closes while weight *L* keeps a steady current of air passing out *h*, and so on every inflation of *E* by the bellows *A* will cause *H* to rise a little, to settle again when the bellows *A* are filling with a fresh supply of air. If, now, we let the tube *h* rise up through the bench *B*, as shown at *k*, fig. 1, we have a tube supplying a constant stream of air for our blowpipe, and we can vary the force of the blast by increasing the weight of *L* and working our bellows *A* a little faster. The tube *h* to *k* can be of rubber for convenience. We next come to the blowpipe part; this can be managed in several ways; but in the present day most towns of any size use gas, and for this reason we will consider gas first and then tell how we can make use of gasoline as a source of heat. The effects produced by the ordinary blowpipe is to create first a jet of flame ending in an attenuated cone; second, a scattered flame; both these effects can be got by the automatic blowpipe by managing the flow of gas, and, at the same time, controlling the force of the air jet; to accomplish this perfectly, both supplies of air and gas must be under control of the operator. A compound blowpipe with stop cocks for both gas and air (to regulate the supply of each) can be got for \$3.50, or without stop cocks \$2.50. This kind has to be held in the hand, and consequently does not leave both hands free to manipulate the work. The Burgess blowpipe spoken of above has a stand so you can set it on the bench at any place, and are at liberty to use both hands to hold the work, a condition of things very essential for rapid spectacle work. The simplest form of an automatic blowpipe is to attach an ordinary *L* tip to any jointed extension gas fixture, and then by means of a rubber tube convey the air from *k* to a blowpipe attached to the gas fixture. Such an arrangement is very simple, but simple as it is, it will exceed the space allotted to this article; but it will be considered in our next, as well as how to use such a blowpipe with gasoline or alcohol. The fixtures for working the bellows by means of the treadle *D* will be evident from inspection of the cut.

The Gold and Silver Production of the World.



R. SOETBEER, the well-known professor in Göttingen, has for a long time been engaged with searching inquiries into the subject of the gold and silver production of the world, and in part published the results of his inquiry. He is regarded as the highest authority in this field. His latest publications on the question are carried down to the end of 1884, in which he estimates the produc-

tion of gold and silver, their employment in the different branches of industry, and their shipment to India. Payments into banks and savings' institutions of that country being required to be made in gold and silver, naturally demanded a heavy shipment of these metals thither.

Professor Soetbeer estimates the value of the gold production in the year 1884, at \$93,000,000, and that of silver \$120,000,000. These sums gain in importance only when compared with those of previous years, whereby it will be seen that the value of the gold production in 1884 is smaller by 2 per cent. than in 1883, less by 9 per cent. than in 1882, and less by 13 per cent. than in 1881. Between 1851 and 1860 the average annual production was \$134,000,000, or more by 30 per cent. than in 1884.

In the next following decade (1861 to 1870) it was larger by 25 per cent., and thus the production of gold has not alone decreased since 1850, but also yearly since 1880.

The next question is for what purpose this gold is used. Dr. Soetbeer has calculated that the annual average consumption of gold in the trades of the civilized world, amounts to \$56,000,000, of which \$9,000,000 is used in the United States. The latest report of the director of our mint (1884), however, shows that this amount is understated, and is to be placed at \$14,000,000, and, consequently the sum of \$56,000,000 is rather an under than an over valuation. If this is correct, then only \$37,000,000 of the annual gold production entered into circulation as money.

As regards silver the results were as follows: As was said at the beginning, silver to the value of \$120,000,000 was produced. As is known the production of silver increases steadily, and last year was no exception. This production was 2 per cent. larger in 1884 than in 1883; 11 per cent. larger than in 1881, and by 25 per cent. larger than the average result of the years 1871 to 1880. It is not necessary to go beyond 1870, in order to show the gigantic development of the silver production. Since the decade of 1851 to 1860, it has increased about 300 per cent.

The annual consumption of silver is by the professor stated at \$20,000,000, or the one-sixth part of last year's production, while of gold, two-thirds of its production is in like manner employed. Silver has not been absorbed by India in the same proportional quantity as gold, since 1870. The annual importation of silver into British India is estimated at \$26,000,000, while in 1881 and 1882 it was much less, and, in 1883, it was \$35,000,000. From one-fourth to one-third of the production of gold, and about one-fourth of that of silver goes annually to India.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

THE wedding bells, silenced now by the Lenten season, will, at Easter tide, ring in a great number of weddings, hence a description of correct styles in engagement and wedding rings may not be amiss in this number of THE CIRCULAR. In these love rings, perhaps, less than any others, do abrupt changes occur. A single diamond has long been regarded as the stone pre-eminently appropriate for engagement rings, and while, at the present time, it is quite proper to select some other single gem, the diamond remains the most popular one. It is safe to assert that the majority of engagement rings throughout the country consist of a single diamond set as simply as possible. Notwithstanding the fact that Dame Fashion permits other gems, the prospective bride and bridegroom usually decide that the diamond is the love token *par excellence*. Just as its brilliancy, the multitudinous tints it displays and the superstition that rendered it

an emblem of purity and a glorious life, gained for it, in Pliny's time, the first rank among gems, so to-day it stands pre-eminent.

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PEARLS, which are emblems of both purity and modesty, rank next to the diamond in favor for engagement rings. A single pearl of rare color and luster, simply set, is the correct style. The ruby is another gem affected in the affairs of love, and allowed nowadays to appear in an engagement ring. Its glowing color is emblematic of passionate affection, and divers good fortunes are supposed to attend the wearer of a ruby. A single sapphire, since this stone has become popular, is also employed in the engagement ring, and is considered quite appropriate, being a moral stone, typical of charity and innocence.

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ENGAGEMENT rings should bear in plain script the initials of the engaged people and the date. The old form "J. S. M. to M. C. S." is no longer used, but in its place appears "From J. S. M. to M. C. S.," the date following.

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THE wedding ring from time immemorial has been a plain gold one, and remains so at the present day. Occasionally is employed the French alliance ring that opens in half, being two rings in one, but showing only one ring when on the finger. This latter ring, however, is, as a rule, confined to the use of foreigners—the wedding ring, like the engagement one, bears in plain script the initials of the contracting parties and the date of their marriage.

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THE setting for all fine gems, by the way, is delicate and unobtrusive, and often invisible. This is especially true of all fine solitaires, the object being to present to the gaze the gem pure and simple. Exceedingly brilliant effects are also gained by an association of gems so set and to show no gold. One of the most effective diamond pins seen this season consisted in several fine large clear stones set in a row in form of a short bar pin, the interstices between these stones being filled in with equally clear, bright stones of smaller size. The result was a blazing bar of diamonds. Four small stones set so as to show no gold, if the stones be of good color and sufficient brilliancy, produce, at a short distance, the illusive effect of a large solitaire.

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BOTH importers and dealers in diamonds agree that, while in a general way it may be said diamonds are plentiful and cheap, fine diamonds are scarcer than ever before known in this country, and therefore command prices commensurate with their true value. In a word, there are diamonds and diamonds, diamonds off color and ill cut that flood the market at low prices, and good white stones of desirable brilliancy and size that are never wanting in patrons who are willing to pay for the best. There exists among average buyers much ignorance as to what constitutes a fine diamond. Many people are content if a stone be large in size, very deep or thick and white in color. But these characteristics are by no means all that is wanting to render the stone a fine one. The manner in which it is cut is an all important factor. Of course, color is the first desideratum, for no art in cutting can change a yellow stone to a brilliant white

On the other hand, the purest stone, cut by unskillful hands, remains a dull mass with but little life or luster; its value, in a word, depends largely on the regularity of the facets and its perfect polish. The transcendent brilliancy of what are called fire diamonds, their transparency and their refraction, are almost entirely dependent on skillful cutting and polishing, which bring out in its true light the latent beauty so meagrely displayed in rough stones.

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LAPIDARIES who are thoroughly conversant with their art do not try to increase the value of a diamond by leaving it as heavy as possible; this would be disregarding one of the first rules in diamond cutting, that over-weight, as well as under-weight, detracts from the value of the stone. A diamond may be too deep for brilliancy as well as too shallow. The rule observed among our best lapidaries to-day is, that a diamond, when properly cut, will yield only about forty per cent. of its original weight, and in cutting to obtain the greatest brilliancy, certain angles must be gained that place one-third of the thickness above and two-thirds below the girdle.

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WHILE solitaires, set so as to show as little gold as possible, remain the preferred style in ear rings, these by no means represent the only style permissible. Indeed, during the winter just past, the association of differing gems has been employed in ear rings, as well as in other articles of jewelry, to a considerable extent. For the spring trade is offered a larger variety in ear rings than before for some time, which indicates an increased demand. There is observable, too, a tendency to more ornate styles. Last spring, retail dealers in this city sold few ear rings outside of solitaire rings and the little gold balls. This spring one sees, as has been intimated, a variety of styles. Exceedingly pretty are the little flower and insect patterns set in small stones, and, in some instances, matching brooches. An attractive design is that of a spider, the body of which is a large colored pearl, which characterizes the ear ring as a pearl ear ring, the tiny gems in the head and wings of the insect being subordinate to the pearl. Then there are tiny geranium leaves with a diamond dew drop, or a gold daisy with a yellow stone in the center. Again, the ear ring represents a little gold placque in the center of which flashes a tiny diamond star. A peculiar all gold ear ring consists of a plain gold plate about the size of a half dime, over which swings an open work plate of the same size, which produces a pleasing and novel effect. A number of the more taking designs seen in scarf and ribbon pins are reproduced in ear rings. There are some hoop rings in the market; those of medium size are the preferred sort.

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IN WHAT are termed "brooches," which means now any neck pin too large to come under the head of scarf or velvet pin, and too short to be called a lace or bar pin, appear innumerable designs. In the irregular shaped brooches, flowers and insects continue to be popular designs, and often in the former the flower is made to terminate with a graceful stem which admits of a longer pin underneath than the short or round brooch. Many of the new flower pins are single flowers of gold in Roman or satin finish and without enamel. The beauty of these flower pins depend on the fidelity with which they are modeled from nature as regards their form and the graceful curve of their petals. Flowers that have proven popular in enamel are largely reproduced, such as daisies, apple blossoms and lilies.

These all gold pins are attractive, and form a decided contrast to the enameled pins.

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SOME of the new brooches are quite round. An attractive pattern seen had a Roman gold center bordered with a gold coil that crossed the face of the pin twice so as to leave four irregular angles. In each of these angles appeared a single stone, so that the pin was set with a diamond, a ruby, a sapphire and an emerald.

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AMONG designs old as the hills, and evidently as enduring, are the star and crescent. All the manufacturers report these this spring. They appear on the velvet pins, as brooches and as hair ornaments. Indeed, one of the prettiest hair pins seen this month was a gold one surmounted by a diamond star that quivered and glittered on a flexible setting. The people like these, and there appears no reason why they should not have them. Indeed, it is so refreshing to find the fickle public faithful to any one thing, that it is a pleasure to say the star and crescent are popular designs.

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‡ BUT the star and crescent are not the only old designs that hold good; there are the padlock bracelets, the old spring bracelet and the ever convenient lace or bar pin. These are all on the list for the spring and summer trade, and greatly would be missed had they not appeared.

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THE velvet pins are out in a bewildering variety of styles and promise to be one of the good selling articles during the summer, being especially adapted for summer wear, and great favorites with young ladies who find the velvet neck bands exceedingly becoming when ornamented with a handsome velvet pin.

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IN BROOCHES, also in lace pins and the decoration of bracelets as well, appears the extended employment of vari-colored golds, by which flower patterns especially are made to simulate nature in their coloring. This same idea of approaching the model in color as well as form, is often assisted with colored diamonds and other stones. Specimens seen that were especially attractive, had for their models grasshoppers, butterflies, humming birds and flowers with their garniture. Sleeve buttons also partake of this decoration. A pair seen had a colored background, overlaid with vari-colored leaves and flowers. This employment of golds of differing colors in fine gold jewelry has brought about many attractive and curious styles of ornamentation.

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THE beautiful finish gained in opalized jewelry, described in detail several months ago, is a notable instance of what can be done by a harmonious association of vari-colored golds. The opalized jewelry referred to, which includes brooches, bar pins, ear rings and full lines of cuff buttons for both sexes, shows a surface covered with delicate mosaic of different colored golds that reflects the opalized

effect which suggested its name. This tessellated surface, composed of minute flecks or bits of gold, with its play of many colors, affords an exceedingly unique as well as artistic finish which is very pleasing without any other decoration. It also furnishes an admirable background for the display of gems, and is employed with effective results for initial cuff buttons.

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SINCE its introduction, this gold mosaic work has been employed in a variety of combinations. New goods for the spring trade present a number of pleasing associations. In illustration is a cuff button, with a bright gold border and opalised center, in the middle of which appears a trefoil of colored gems. Again, there appears a combination of mosaic work, green vines in relief, engraved scrolls and bright finish. Very popular with the trade are cuff buttons with an opalised surface, on which appear an initial in bright gold. Sometimes the initial is set in tiny pearls or diamonds, when the effect is very rich and pleasing. The new cuff buttons, by the by, include the square, cushion and round shapes, as well as link buttons. Flower pins, also pins simulating autumn leaves, are effectively finished with this opalised surface.

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A POPULAR finish in gold jewelry is heavy chasing. Sometimes the ornament shows a surface entirely covered with this chasing; again, it is employed in combination with the bright or Roman finish. The association of gold and platinum, especially in gentlemen's watch chains, continues. Indeed, as the reader must by this time have surmised, much of the gold jewelry in the market now owes its ornamentation to a combination of metals and several styles of finish. Quite in contrast with this jewelry is the all gold jewelry which shows only one style of finish, such as the flower pins already described.

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AN ATTRACTIVE finger ring is one that simulates two rings each set with three little gems, and slipped a little so that the settings do not interfere. One seen gave the appearance of two rings, one with a ruby and two diamonds set in line; the other with a sapphire and two diamonds set in line.

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THE saddle bracelet, a sort of sporting ornament, judging from the description found in French journals, has not appeared here, at least a search for it this month in leading up-town stores did not result in finding one. This bracelet, which represents a small saddle, flaps, leathers, stirrups and girth of gold, is doubtless one of the many novelties introduced in Paris to satisfy, for a brief season, the desire for something *outré* that appears to possess French women nowadays.

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THE "new precious stone," "agathé arborisée," which, according to French fashion correspondents, has just made its appearance on the Paris market, while curious and interesting, is by no means "precious," if we may believe American authorities in such matters. The claim made for this stone is that, by some inexplicable freak of nature, it represents a landscape, a sea view, a tree, a plant or other objects in nature. One writer goes so far as to describe a stone that reflects the images of the Virgin and Child. A well known mineral-

ogist who has been interviewed on the subject of the agathé arborisée, for the benefit of THE CIRCULAR'S readers, rejects the theory that these perfect little designs are nature's own work of art. He pronounced this so-called phenomenal stone an imitation moss agate that has gained its apparent etchings of trees and plants by the aid of photography. These opinions are the result of careful investigation and examination of notable specimens of this stone. The fact that these stones can be bought in Paris at a sum not exceeding \$10 of our money, is proof sufficient that the agathé arborisée cannot properly be classed as "precious," though, as has been intimated, it is both curious and interesting.

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WHILE the ladies have worn comparatively little jewelry on the street during the past winter, there has been a glittering display of gem jewelry at the opera and other evening entertainments where full dress toilets were required. Bracelets, necklaces, pendants, ear rings, hair ornaments and strands of diamonds and pearls festooned across the corsage of the dress, have been repeatedly worn by one person on one occasion. People who live outside the pale of what is known as "fashionable society," and who see the queens of society only in the stores, on the street or at church, cling to the old idea that jewelry is but little worn, for the ladies whom they meet are in street or carriage costume, with which, as has been already said, but little jewelry is worn. If they could only see these same ladies when their evening toilets are donned what a revelation it would be. For the benefit of readers who do not have an opportunity for seeing fashionable women by gaslight, is here given a description or two of the gem jewelry worn by some of the well known women in society. Mrs. Marshall O. Roberts, of New York, wore recently, at a reception, a branch of green leaves festooned across the front of a low cut corsage on which were fastened numerous diamonds of great size and set in different designs. Several strands of pearls encircled her throat, and beneath these appeared a necklace of diamonds and a large pendant of the same stones. In her ears were diamond rings and on her arms diamond bracelets, while from her hair flashed diamond ornaments. An equally well known lady appeared on the same occasion in a black velvet dress, across the corsage of which hung two long strands of diamonds, to which were fastened several diamond ornaments. Several strands of pearls and four large rosettes of diamonds were on her neck, and other ornaments, composed of diamonds, glittered in her hair.

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THE wide license given in all matters pertaining to dress, extends to jewelry, and explains the absence of set styles. This freedom is due in large part to the people who have traveled in many parts of the world, and acquired along with the odd and curious ornaments picked up here and there, a lively taste for unique styles regardless of any prescribed fashion. An illustration at hand is the cameo brooch worn by the wife of Representative Arnot, of New York, which has been at once the envy and admiration of other women during the season just past. This cameo is about the size of a silver dollar and represents "morning." To carry out the illusion it is set as a sun, the rays around it being formed on the outer rim by diamond studded points. Now, every jeweler will tell you that cameos are "out of fashion;" and so they are, in the common acceptance of the phrase, yet a fine cameo in unique setting is one of the prized pieces of jewelry of a woman of society and fashion.

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THE fashion of wearing beads, dog collars and velvet neck ribbons close up around the throat, continues. Bead necklaces are just now

in great request. Ladies who have real pearls wear these in three or more rows tight around the throat and tied at the back by a velvet ribbon. Where real pearls are out of the question, white or colored imitation pearls are worn. Sometimes the rows of beads are sewed to the band of velvet which is of the same shade as the beads. Garnet beads on a garnet colored velvet, make an effective neck ribbon; so do pink imitation pearls on a pink ribbon, or gold beads on a gold colored ribbon. Neck bands of velvet decorated in front with a velvet pin is one of the leading styles of necklace.

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THE number of people who patronize silver plate ware is no mean proportion of the population of this country, and it is increasing every season. Almost everybody understands by this time that the best silver plated ware, with ordinary usage, lasts from ten to fifteen years, and half as long again with careful treatment without re-plating. Indeed, tea sets, castors and the like in the hands of women who look after their own household cares, as made nowadays, will last an ordinary lifetime. Spoons and knives, the articles that require re-plating oftenest, in nine cases out of ten have not been given a fair opportunity to test their lasting qualities. The kitchen maid, except when under the surveyance of a careful mistress, makes little difference in her treatment of steel implements which require a daily scouring with bath brick, and the silver plated goods with which scouring brick ought never to come in contact. Of course, the heaviest of plated ware is not proof against many vigorous applications of elbow grease and coarse scouring brick, and yet it is often subjected to this and similar rough treatment. The reasonable prices at which the best plated ware is now put on the market brings it within the reach of the popular trade, while the artistic forms and attractive finish with which it is presented, appeals to many who can afford the luxury of sterling silver. Indeed, in many cases, the solid silver service is in some safe deposit down-town while the family are dining up-town off plated ware.

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A RECENT inspection of a leading manufacturer's stock failed to disclose any decided changes either of form or finish; low forms prevailing, for the most part, in table ware, with *repoussé*, fluted, bright, satin and other popular styles of decoration about equally divided.

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THIS inspection disclosed the fact that while the tendency among the *creme de la creme* is to the use of individual salts, peppers, oil and vinegar cruets and mustard pots, the caster holds its own with a large and very respectable patronage. This time-honored piece, however, is no longer the great cumbersome affair that once occupied more than its share of space on the table, and overwhelmed modest guests with its ornate decorations. The caster of to-day is, on the contrary, a light and graceful piece; often with the slightest possible framework of silver, just sufficient to serve the purpose of holding the bottles. These bottles come in unique shapes and are finely cut or engraved. It goes without the saying, that American cut glass is the sort used nowadays by our best manufacturers of sterling silver casters.

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IN THIS connection it is only fair to speak a good word for some

of the American pressed glass, the finer specimens of which are employed in some of the plated casters.

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WITH the increased demand for artistic silver and electro-plated dinner services, has steadily grown many English customs, among which may be mentioned the fashion of candelabra in the dining room. In consequence of this custom, many English designs have been copied by our own manufacturers in plated goods, and these afford, with designs originated here, a large variety from which to select. These candelabra are not confined, however, to the dining room, but appear in parlors and boudoirs, and are made also of other metals such as brass, copper and iron.

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THIS leads me to mention again the unique and beautiful table ware that is being made in the baser metals. Coffee and tea urns, after-dinner coffee sets, tea caddies, punch bowls and the like, lined with pure silver, but of copper, brass or iron, are now on exhibition. The iron ware, especially in decorative pieces, such as vases, revives antique forms and styles of ornamentation. The copper ware shows that peculiar smooth, glossy surface that first attracted attention in small pieces, such as trays, smoking sets and the like, while the brass work, in some instances, copies designs used in silver ware, such as a fluted body with plain neck and lip.

ELSIE BEE.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

Trade here is still rather dull, but a careful investigation of the exact condition of affairs shows that business is considerably ahead of last year. A small minority of chronic croakers will persist that things are going from bad to worse, but the preponderating testimony of the vast majority of the trade gives no indorsement to this pessimistic view of the case, but rather goes to prove that the business outlook is satisfactory, if not encouraging. All the leading houses here concede that while trade may be what is commonly called "dull," the volume of business transacted for the month is entirely up to anticipations. When the serious obstacles to business that have accidentally cropped up during the month are fairly discounted, it must be allowed that the general outlook is reassuring. The principal reasons assigned for the general dullness in trade are the troubles of the Dueber Company with the Association and the Knights of Labor, and the railroad block in the Southwest. Since the former causes for discontent have been amicably arranged, a more hopeful feeling has sprung up in the trade, and all indications point to a reasonably speedy settlement of the railroad trouble. It must be admitted that the Dueber affair and the railroad block are responsible for any falling off that has overtaken Western business, but, when closely examined, the effects are not nearly so far reaching as some of the disgruntled jobbers give out. Your correspondent failed to elicit anything that would go to prove that business has so far had any serious set-back. There is no denying that the continued effect of the strike on the Gould roads may ultimately have a disastrous influence on the jewelry business in the West and Southwest, but present forecasts indicate an early satisfactory settlement of the difficulties. Cashiers in the leading banks say that they have never known deposits to be so low in a long time as during the last few weeks, but calm reflection on this side issue shows that collections have been entirely commensurate with the volume of business done. The significant fact that

no failures have occurred bears potent testimony to the safe conclusion that the Western jewelry trade, despite a few groundless croakings, is by no means in bad shape.

St. Louis, and other points in the Southwest affected by the great railroad block, will undoubtedly suffer, but unless some local development of the trouble crops up, there is little reason to believe that Chicago will be much affected. The depression attending the strike is having a crushing effect on business generally in Kansas, Missouri, Texas and a few contiguous States, but, outside these, little depressing effect on trade has been experienced. Should the strike, however, prove protracted, a very serious interruption to all kinds of business in the Southwest must inevitably follow.

"Business," said Mr. Thomas Davies, of Clapp & Davies, "is rather dull, but as things are ahead of last year, I see no cause for apprehension. Now that the Dueber troubles have been settled, business ought to go with a rush. The indirect effects of the Dueber difficulty and the strike on the Gould roads have certainly had an unsettling effect on business, but so far no very material loss has been suffered by the jewelry trade." More encouraging still was the verdict of Mr. Alister, of B. F. Norris, Alister & Co.: "Our business during March has been much better than for the corresponding month of last year. Orders have materially increased and collections have been satisfactory. Our travelers in Kansas and Missouri are finding things a little dull, but those in Iowa and Minnesota are doing an exceptionally brisk business. The Dueber affair and the stiffening of prices in silverware, as well as the talk about changes in the price of flat ware, have certainly had somewhat of a disquieting effect on business and diminished the number of orders, but, making every allowance for these considerations, I still think that the trade is in very good shape." Mr. Julius Schnering, of Otto Young & Co., reports business as being considerably in advance of last year. Each of the last eleven months, he says, have shown much better returns than their corresponding predecessors. A few hard-up jobbers and retailers could be found around, but, generally speaking, money was easy. Chicago had so far suffered almost nothing from the railroad trouble in the Southwest. Messrs. Stein & Ellbogen consider business in good shape, and declare that there is an easier feeling all over. They, like many others, have suffered to some extent from the unsettled prices in certain lines of goods, by reason of which orders have been delayed. Altogether they report business during the latter part of February and the early days of March hardly up to anticipation. Giles Bro. report the month's business as footing up very well, and orders coming in briskly all the time. Mr. Moore, of Benj. Allen & Co., is quite satisfied with the outlook, and reports a considerable improvement in business when compared with last year. Travelers were experiencing some dullness in Arkansas and Indiana, but in Wisconsin they expected quite a boom when the men came in from the woods. Cogswell & Wallis, Samuel Swartchild and others deplored the general dullness of trade, but were expecting a better condition of things to set in very soon.

The National Association of Watchmakers and Jewelers, which is now represented by over 250 members from thirty-seven States and Territories, is busily engaged in commending its claims to the jewelry trade of the country. A considerable number of prominent jobbers here have joined the Association, but others are hanging out through various prejudices against the constitution and intentions of the order. M. H. Berg, the indefatigable Secretary, is sending out by mail thousands of copies of the report of the first annual meeting, accompanied by a circular explaining the objects and workings of the organization, and the prospective advantages which it will confer upon the trade at large. A large acquisition to the membership is anticipated from the circulation of these reports.

Benj. Allen, who has not been in very robust health for some time past, left early in March for Southern California, where he will rusticate for five or six weeks until more equable weather sets in at Chicago.

Giles, Bro. & Co.'s anti-magnetic shield is meeting with increasing

recognition. Their employees are busy at work applying it to government chronometers for H. H. Heinrich, of New York. Mr. Giles expects that the shield will soon come into general use for the chronometers in all iron ships. His patent is receiving the highest indorsement from electricians and others in all parts of the country.

Joseph S. Gratz, the absconding jobber who was brought back from Texas some time ago, still languishes in the county jail. Through failure to obtain the necessary amount of bail, he will remain in his present quarters till the time of his trial.

A. H. Bradley is closing out his business at the corner of Madison and Dearborn streets, and Perry Bros., whose affairs have been pretty much at a standstill for some time, do not expect to resume active business operations until the approach of the fall trade.

W. A. B.

Superstition About Precious Stones.



THIS singular, says a European writer, that the superstition yet lingers about the precious stones represents, happily, a fast diminishing quantity. Who would think now of attributing to each stone a special influence over each month, and wearing, therefore, the sapphire in April, the agate in May, and so forth. Yet our ancestors did this, and even appropriated to twelve kinds of stones, the twelve signs of the zodiac and the twelve apostles. Perhaps there was some pious intent in making the jasper the symbol of St. Peter, the crysolite of St. Matthew, or the uncertain beryl of the disbelieving St. Thomas; but the modern spirit does not require these reminders, and their value at any time must have been very doubtful. But, smile as we may at the superstition that ruled in bygone times with regard to precious stones, we have to admit that it was not altogether without its brighter side. In the dark ages, for instance, it can have been no mean happiness to possess gems which, like the diamond and amethyst, reduced war to a safe and pleasant pastime. What charm have we wherewith to face the perils and misfortunes of life comparable to the faith in their talismans which supported our ancestors? Who that remembers the agitations of a lawsuit and the nervous reliance placed in his solicitor, but might respect the faith which in a previous age and similar plight he might have felt in a morsel of chalcedony?

Science, moreover, in many cases, leaves no compensation for the belief she dispels. It was no trifling alleviation of the peasant's lot that he might hope any day to find a rich jewel left by a snake in the grass, or vast treasures hidden in a mountain.

This hope is now gone, or going, from him, and, perhaps, few living Cornish peasants now look for the blue stone ring which their ancestors attributed to the action of snakes breathing upon hazel.

Who now that drinks the refreshing Vouvray wine, from Vouvray, in France, would ever think that the name of both wine and place had come from an old local belief in a dragon or viper (*vouivre*) that possessed a single eye, or carbuncle, which it laid aside on the ground, and which, if discovered, would lead its finder to immeasurable riches.

ANOTHER LARGE TELESCOPE.—The new Paris Telescope in course of construction will be larger than any other now made of the refracting class. The object glass will be 32 inches diameter, with a focal length of 49 feet. The one just placed in the Observatory at Princeton, New Jersey, has an object glass of 23 inches diameter. That at the Vienna Observatory is 27 inches, Mr. Newall's at Gateshead, England, and the one in the Washington Observatory, are 26 inches in diameter. Admiral Mowchez has decided to use a gas engine for revolving the dome which will cover the Paris telescope.

Foreign Gossip.

ROMAN GRAVEYARD.—An extensive Roman graveyard was a short time ago discovered near Worms, Germany. Several of the sarcophagi (stone) contained very valuable Roman glasses, of which 70 were collected.

CHEAP WATCH OR BAD CLOTHING.—A gentlemen's furnishing store in Leeds advertises that it will give a genuine silver watch, English make, to every purchaser of a bill of clothes amounting to £2½. Either the clothes or the watch must be bad.

HOROLOGICAL SCHOOLS.—The watchmakers of Europe are beginning to find out more and more that "it don't pay" to teach apprentices, and the horological schools are therefore better patronized from year to year. At the Vienna school 149 candidates applied for admission, 138 of which were received.

WHAT THEY KNOW OF US IN EUROPE.—The Central *Zeitung* says that nowhere is copper more universally used for roofing than in North America, and this material is rapidly crowding everything else out of the market. Sheet copper is so cheap that it is taking the place of sheet iron for stove pipes. Smart people, those Europeans.

SUNDAY A REST DAY.—The laudable example of the strict American observance, at least as far as work is concerned, of Sunday as a day of rest, is daily gaining ground on the continent. Before us lies the Austro-Hungarian *Uhrm. Ztg.*, which contains a warning to its readers about working on Sunday, as repeatedly a number of its readers and others have been mulcted for this non-observance. "Six days shalt thou labor, and do all thy work," etc.

PAYING INSTITUTION.—The financial result of the "German gold and silver refining establishment," although not yet quite ready for delivery, gives all reasons to anticipate a clean profit of 508,000 marks, equal to 28 per cent. of the capital. A dividend of 12 per cent. was about to be declared, but the superintendency have changed it to 15 in view of the excellent results. It is encouraging at all events, to know that somebody, at least, earns something.

WRANGLING.—Our continental exchanges, especially the German, are remarkable, beside their horological articles, for their endless bickerings, wrangling and strife among each other or their readers. A. advertises that "he has the best line of watches to be found;" forthwith fifty other watch manufacturers pitch into him for making lying assertions; this turns into a free fight among the different correspondents, and "you are another" is freely indulged in all around. We cannot take up a German horological paper without meeting with a correspondence of that nature.

RARE TOWER CLOCK.—A little town in Hungary contains a rare clock, divided in two church steeples—a Lutheran and a Calvinistic—made by a swine herder, who first carved the model from wood. The two steeples are separated by a broad street, and one of them contains a part of the clock with quarter train, the other with hour train; the latter only resounds after the former has ceased striking. The two parts of the clock have acted in harmony for upwards of a hundred years, and we hope the brethren underneath have done likewise, although this is open to doubt.

NEW METER.—A French watchmaker has constructed a new measuring yard, at the end of which a counting wheel arrangement has been let in, upon which the hand is placed in measuring fabric; a head projects a little beyond the level, at the place where the thumb is generally placed, and a slight pressure upon it will correspondingly actuate the counting arrangement and cease as soon as the pressure is slackened. The thing is so simple that every one of our readers will readily catch the idea. It is excellent for salesmen who, during counting and measuring, are asked innumerable questions.

COMMERCIAL TRAVELERS' TAX IN URUGUAY.—Our business houses which send traveling salesmen to Uruguay had better take notice of the fact that that country recently enacted a law by which all commercial travelers not residents of the country, and representing foreign houses, have to pay an annual business tax of 500 pesos. After the payment of this sum, they receive a certificate, good for one year, and can then transact business. Home firms have for a number of years complained at the injustice of admitting foreign travelers free of payment, while they themselves were required to pay a heavy tax, and this led to above enactment.

VALUE OF PUBLIC PROPERTY IN PARIS.—The Prefect of the Seine has called for and received an inventory of all the property belonging to the city of Paris. Its value amounts to 12,246,660 francs. Of this, 4,178,000 francs worth of art treasures are contained in the several city buildings, and the 68 religious institutions are estimated at 8,078,000 francs. The church of St. Eustachius alone possesses paintings and sculptures worth 700,000 francs, St. Germain-des-Prés, 642,000. The city storehouse on the Boulevard Morland contains 69 statuettes, estimated at 389,000 francs, and still await placement. The sculptures of the city hall have a value of 1,384,000 francs, and the gardens and parks contain works of art valued at 1,000,000 francs, the emblem of the republic, on the Place Chateau d'eau, being valued at 300,000 francs. All the works of art in the collection of plans of Paris are valued at 1,714,000 francs, those of the library and the museum Carnavalet, 1,320,000 francs, and of the other libraries of the city at 648,334 francs.

HISTORIC WATCH.—A home paper says that a resident of Ronkonkoma, L. I., possesses a gold watch which formerly belonged to the ill-fated Marie Antoinette. It is about the size of a trade dollar in circumference, and is open-faced. On the back it bears the device of the French queen, a Cupid on a cloud, worked in gold and silver. The features of the boy god are nearly effaced by long wear. A wreath of Guinea gold and one of Roman gold surround the disk. The hours on the dial are marked in odd-looking Arabic numbers. The porcelain shows the ravages of time in minute cracks at the edges, and the silver hands, nearly black with age, are thickly studded with small diamonds. The legend the owner gives is that the watch was the gift of the queen to the architect of the Tuileries, who shot himself through the head on the day following her execution by the revolutionists. Its present owner was the near relative of a well known American poet, now dead. The watch came into his possession through marriage, as a gift from his wife's father, who is a direct descendant of the original recipient.

REMARKABLE ADVENTURES OF A WATCH.—We read the following remarkable adventure of a watch in an old newspaper: In December, 1787, some men fishing in the Thames, near Blackwall, caught a sea wolf. They noticed that the fish was sick or almost dying by the little resistance he made at the time of catching. He was drawn on shore, and when killed and disemboweled, a silver watch and chain, a garnet ring and several pieces of gold border were found in his stomach. From these pieces it was presumed that the articles belonged to an officer who might have fallen overboard and was devoured by the fish—a supposition which was quickly affirmed. The watch contained the following label: "Henry Watson, London, No. 1369." Inquiries were set on foot; he examined his sales' books, and found that two years previously he had sold the watch to a Mr. Thompson, living in the East End. This Mr. Thompson recognized the watch, having presented it to his son about to make his first sea voyage. Having established the premises, it was soon ascertained that the young officer had disappeared during the night, about nine miles from Falmouth, and he was generally supposed to have deserted while on watch on deck, during which time he had doubtless tumbled overboard and been devoured by the fish. He himself had been digested, but the metal proved to be too much for the fish.

Workshop Notes.

TO CUT GLASS WITHOUT A DIAMOND.—Scratch the glass about the shape you desire with the corner of a file or graver; then having bent a piece of wire in the same shape, heat it red hot, and lay it upon the scratch, sink the glass into cold water just deep enough for the water to come almost on a level with its upper surface. It will rarely ever fail to break perfectly true.

TO HARDEN PINIONS.—I have for several years used petroleum for hardening pinions with the best results. The steel parts to be tempered are first heated upon charcoal in the customary manner, then annointed with ordinary washing soap, heated cherry red and quickly immersed in petroleum, without anticipating that the latter might ignite. Steel articles heated in this manner do not warp whatever, no matter how thin, and remain almost entirely white.

CENTER OF GYRATION.—That point in a rotary body in which the whole of its energy may be concentrated, is called its center of gyration. A circle drawn at seven-tenths of its radius on a circular rotating plate of uniform thickness, would represent its center of gyration. The moment of inertia, or the controlling power of balances, varies as their mass and the square of the distance of their center of gyration from the center of motion. Although not strictly accurate, it is practically quite near enough in the comparison of balances to take their weight and the square of their diameter.

TO REPAIR THE FUSEE TOP PIVOT.—First file up and re-polish the square, taking off the corners sufficiently to prevent them standing above the pivot when it is re-polished. Put the square into an eccentric arbor and get the fusee quite true. Now, put a screw ferrule on to the fusee back arbor, and put the whole piece in the turns with the eccentric in front, using the bow on the ferrule at back. If the pivot is much cut it should be turned slightly with the point of the graver. Polish first with steel and coarse stuff, afterward with bell metal and fine stuff, and finish with the glossing burnisher.

DRILLING TEMPERED STEEL.—Make the drill oval instead of giving it the usual form, and temper it as hard as possible without burning. Touch the surface of the metal to be acted on with a little dilute nitric acid so as to render it slightly rough. Lubricate the drill from time to time with essence of turpentine instead of oil (some workmen use kerosene or good rectified petroleum in which camphor has been dissolved). When the drill will catch no longer, clean the hole at the bottom with the turpentine or kerosene with the addition of a little acid, and continue the operation. This method is a little complicated, but it is the only safe way for drilling steel.

RESISTANCE OF AIR TO PENDULUMS.—The resistance offered to a body in motion is proportional to its dimensions and the square of its velocity. One body moving with the same velocity of another one, and the surface of which is only half of that of the other one, suffers a resistance amounting to only one half of that borne by the larger body. The velocity and weight of the pendulum determine the magnitude of its motion, and by them is overcome the resistance of the air. If we suppose the velocity of two pendulums the same only weight can alter the moving power, and the greater the relative weight the more power must be present to conquer its resistance of the air. Hence follows: that for a pendulum a body of great specific weight must be employed, and that the resisting surface of the body must be made as small as possible. Since its spherical form, of all others, is that which decreases most the surface of a body, taking the mass as such, it appears to be especially adaptable for the oscillating body of the pendulum. But the motion of the latter occurs only in two directions, consequently its air offers resistance upon two sides only, therefore experience has demonstrated that the lentil shape is more suitable than the spherical, and for this reason is generally employed.

THE RECOIL ESCAPEMENT.—This escapement receives its name from the peculiar action of the pendulum. There is no rest or locking for the pallets, but, directly the pendulum in its vibrations allows a tooth, after giving impulse, to escape from the impulse face of one pallet, the course of the wheel is checked by the impulse face of the other pallet receiving the tooth. The pendulum, however, still continues its swing to the right, and in consequence the pallet pushes the wheel back, thus causing the recoil which gives the name to the escapement. It is only after the pendulum comes to rest and begins its excursion to the other side that it gets any assistance from the wheel, and the difference between the forward motion of the wheel and its recoil form its impulse.

UPRIGHTING THE CENTER WHEEL.—The holes in the bouchons of the plate and bridge are left a little smaller than is required by the pivots. After centering the plate in the lathe the bouchon is turned flat on the inner side, and then again inspected with the pump center whether the hole coincides exactly with the center of the clamp head, and trifling differences are entirely corrected by slight taps with a wooden mallet upon the edge of the plate. When by doing this we are fully convinced that the hole stands at the right place, we turn it open with a thin graver (a chuck graver is best for this purpose), until the pivot almost fits into it. Then, without taking the plate out of the lathe, screw on the bridge, which has already been provided with a bouchon, and open its hole similar to the first. Beginners must be careful to have the graver very sharp, as a dull one simply scrapes but does not cut.

EASILY FLOWING YELLOW HARD SOLDER.—A yellow solder is frequently required in country shops; it must flow at a low heat, and be a hard solder at the same time. Of course, each shop contains its own recipe, each one possessing its own merits, but the following will be found as good as the best: For an easy flowing five karat solder, take 5 dwts. gold, 13 dwts. silver and 6 dwts. copper. Melt and cast into bars; as soon as it can be handled, break into pieces and throw into the melting pot; while the pot is hot add 15 grains of brass and melt again; when thoroughly mixed, cast into a bar and roll out thin for use. Another solder, much used for low grade gold, is made as follows: 3 dwts. gold, 2 silver, one-half copper; melt as above, and at the second melting add, when fused, one-half dwt. zinc in small pieces, and as soon as mixed pour into the mold. This solder runs at a dull red heat; three-fourths dwt. zinc in place of one-half would flow sooner, but would be apt to eat into the work if too high or too low heat was used. But that would be of little consequence if the article to be soldered was of brass.

STONES FOR JEWELING.—The stones used for jewelers watches, says Mr. Glasgow, are the ruby, sapphire, chrysolite and garnet; a thin rose diamond is generally put as an end stone or cap jewel to the balance cock of English watches, but only as an ornament, and that is the only diamond ever used in the jewelers of a watch. There is an uncharitable belief that watchmakers sometimes change the jewels in watches for stones of inferior value, but there is no foundation for the calumny, and the time spent in making the exchange would certainly exceed the value of the best holes. There are a great variety of these stones, so that it cannot be said that a ruby is best for a hole unless it is the right sort of ruby, and color is not always a guide as to the quality; the Oriental ruby is the best, being the hardest and having the greatest specific gravity; it should always be used for the best watches. Sapphire is usually used for the holes of marine chronometers. Rubies that have a deep red color are prized and used by the Swiss, while in England the milky stone is preferred as being harder; it is also thought that in consequence of the coloring matter, the red stones blacken the pivots more than the light-colored ones. My own experience is that if the stone is hard and well polished the color is not of much consequence, since, although the pivot becomes black it does not cut, and the discoloration is easily removed with a peg and a little fine red stuff.

Trade Gossip.

L. Adler & Co. have removed to 44½ Maiden Lane.

J. Bulova has removed from No. 49 to 57 Maiden Lane.

Mr. George T. Bynner is now representing the firm of Rehmann Bros.

Bryant & Bentley will remove from No. 12 to No. 10 Maiden Lane.

E. A. Lauten & Co., have removed to No. 12 W. 4th street, near Broadway.

Mr. Adler, of the firm of L. Strasburger & Co., sailed for Europe on the 29th.

J. C. Wilbur has removed from 150 Broadway to 41 and 43 Maiden Lane.

C. F. Koester will remove from 33 John street to 41 and 43 Maiden Lane.

A. Eisenberg, of San Francisco, has removed from 206 to 208 Kearney street.

Mr. Joseph Gansl, of Minneapolis, was married in this city March 3, to Miss Ida May.

The Spencer Optical Mfg Co., will remove during the month to No. 15 Maiden Lane.

Mr. George F. High, of Medina, O., has succeeded to the business of I. R. High & Son.

Wm. H. Ludeman has removed from 75 and 77 Nassau street, to 41 and 43 Maiden Lane.

Roseman & Levy, of Elmira, N. Y., will open a branch office at 41 and 43 Maiden Lane.

F. Jeandheur, Jr. has removed from 122 Fulton st. and 25 John st. to No. 6 Liberty Place.

The Illinois Watch Company have commenced delivering their new Nos. 4 and 6 movements.

H. Oppenheimer & Co., Kansas City, Mo., has dissolved, H. Oppenheimer continuing the business.

Mr. August Oppenheimer, of Oppenheimer, Bros. & Veith, arrived from Europe in the *Gallia* on the 29th.

The Jewelers' Board of Trade have also secured offices in the Knapp Building, Nos. 41 and 43 Maiden Lane.

Link & Conkling, manufacturing jewelers, Newark, N. J., have dissolved. Wm. Link will continue the business.

Mr. W. A. Lee, formerly with the Ladd Watch Case Company, is now representing H. C. Hardy & Co. on the road.

Mr. Herman Levison, of Levison Bros., San Francisco, is expected in New York early this month on his way to Europe.

Mr. C. W. Constans, of Blue Earth City, Minn., has retired from the jewelry business to engage in another occupation.

C. W. Little, formerly of Denver, Col., has located in the Knapp Building, where he will do a general jobbing business.

Mr. Racine, of Julien Gallet & Co., left on the *Servia* for Europe, on the 27th April, and will return about August 1st.

The firm of E. G. Webster & Bro., having been dissolved, the business will be carried on in New York by E. G. Webster & Son.

Mr. Charles Jung, late with Mr. Charles Schlag, will be one of L. Sauter & Co.'s representatives on the road the ensuing season.

The firm of Webster, Brother & Co., of Brooklyn, N. Y. has been dissolved. The business will be carried on by A. A. Webster & Co.

M. Fox & Co., have opened an office at 27 Holborn Viaduct, London, which will be under the management of Mr. G. L. Fox, of the firm.

A. Corn and N. E. Clark have formed a co-partnership under the firm name of Corn & Clark, dealers in optical goods, at No. 52 Maiden Lane.

Mr. L. W. Kimball, for the past four years with Cross & Beguelin, is now representing G. H. Leonhardt to the jobbing trade in this city.

Mr. Louis de Goll has charge of the New York Office of the Roy Watch Case Company, which is located at No. 1½ Maiden Lane.

We desire to call attention to the advertisement of Taylor & Brother, who announce the receipt of many novelties for the spring trade.

Hartman & Son, doing business near Plainville, Mass., have admitted to partnership Mr. Wolfe, formerly with Wade, Davis & Co., of Plainville.

H. H. Heinrich, chronometer maker, has removed his business office from 18 to 14 John street, in order to have his workshop and office together.

R. & L. Friedlander have introduced a full line of Knights of Labor pins. This season they have added to their stock a full line of movements and cases.

At a recent meeting of the Silver Plated Ware Association, it was resolved to advance prices of hollow ware 10 per cent. The advance went into effect March 5.

Among the recent arrivals from Europe were Mr. Moses Kahn, of the firm of L. & M. Kahn & Co., and Louis Neresheimer, of E. August Neresheimer & Co.

B. & W. B. Smith insert in their advertisement this month an illustration of the interior of Reed & Barton's store in Union Square, which was fitted up by them.

The Paul E. Wirt Fountain Pen, of which H. M. Smith & Co. are agents, is meeting with such success that the manufacturers are unable to keep up with their orders.

The Pivot Diamond Setting Co., in addition to their new patent Setting, are manufacturing a large variety of Pendant Settings which embrace many new and artistic designs.

Mr. Charles Shaw, late of the Howard Watch and Clock Company, has established himself at No. 105 Fulton street, where he will carry on business as a jobber in jewelry and watches.

Mr. E. Gluck, formerly of Tuscaloosa, Ala., has removed to Birmingham, in that State, where he has formed a co-partnership with Wm. Black, under the firm name of Gluck & Black.

Mr. C. E. Hastings, of the firm of Carter, Sloan & Co., has returned from California. He reports having had a most enjoyable trip, and says that business on the Pacific Coast is excellent.

Messrs. S. F. Myers & Co. have issued a circular illustrating all the latest designs in emblems, rings, etc., of the Knights of Labor order, which at present are in great demand all over the country.

A souvenir of the "Mikado" is being sent out by F. I. Marcy & Co. It consists of life pictures of the "three little maids from school," and is something to be treasured as a very handsome engraving.

The owners of the schooner *Fannie A. Gorham*, through their attorneys, have made a claim against Messrs. M. Fox & Co., for salvage compensation in saving a quantity of their diamonds from the wreck of the *Oregon*.

Frank A. Moesta, of Kittanning, Pa., has disposed of his furniture and fixtures, and will close out his stock as rapidly as possible with the intention of moving to Kansas City, Mo., where he will open a jewelry store this spring.

Our readers will find it to their interest to inspect at Messrs. L. Straus & Sons their latest novelties in bisque appliqué mounted on velvet, consisting of a dozen different subjects, and the bas-relief on velvet gives them a most magnificent appearance, as well as their new goods in old ivory finish in cabinet figures and busts. The imitation is so true that it requires the closest inspection to distinguish it from real carvings in ivory.

It will be seen by a reference to our advertising columns that Messrs. H. Z. & H. Oppenheimer will send on memorandum to any jeweler in good standing, one pair of their solar brilliant ear rings in gold settings.

One of the funny men of the daily press says that a Brooklyn man, to ascertain how long the spring of his Waterbury watch was, took off the cover. The spring flew out and knocked his wife through the window and he is now in jail.

Mr. George T. Seal, for the past ten years representing the Derby Silver Company in the west, has severed his connection with that company, and will hereafter represent the F. B. Rogers' Silver Company, of Taunton, Mass., in the western territory.

The Automatic Precious Stone Tweezer is an instrument that will be highly appreciated by all who have to handle gems. It takes hold of the stone securely, and holds it automatically, without troubling the individual handling it to keep watch of it.

Martin Copeland & Co., have opened an office in Chicago, at No. 151 State Street. Mr. Charles Shephard will have charge of it. Mr. Shephard has represented various eastern firms in the west for many years, and is well known to the trade in that section.

Among the callers in our office recently were Mr. A. F. Estberg, of Estberg & Sons, of Waukesha, Wis.; Mr. J. W. Marshea, of Cambridge, Mass.; Mr. Stanley, of Stanley & Camp, of Milwaukee; Mr. Sylvester Hogan, of Cleveland; and D. Buell, of Hartford.

Mr. Oberlander, of the firm of Blancard & Oberlander, will spend the summer in Europe. This firm has acquired an excellent reputation for the specialties they manufacture, which includes settings and galleries, seamless hollow balls of many sizes, etc.

A. Luthy & Co., have introduced a new attachment for scarf pins to prevent their being pulled out or lost. It is very simple and effectually secures the pin. It is applicable to ladies' bonnet or scarf pins, and can be readily attached to pins of any form.

The firm of Edward A. Lauten & Co., that recently suffered considerable loss by fire, notifies the trade that he has resumed the manufacture of jewelry cases, etc., at No. 12 West Fourth street, with improved machinery and better facilities in every respect.

The Shrouds & Kasper Jewelry Company, of Chicago, is composed of Mr. Joseph Kasper, formerly with J. B. Chambers & Co., and C. B. Shrouds, formerly of the firm of Shrouds & Storey. The new company is located at the corner of State and Randolph streets.

The following jewelry firms have also secured quarters in the Knapp Building—Dagget & Clapp, Payton & Kelly, Hahn & Co., Theo. Schmitz, The Manhattan Watch and Jewelry Co., Frank Bayerdoefer, B. H. Davis & Co., H. Rosebaum, W. W. Fairchild.

Mr. Chas. Leo Abry is importing a low priced watch called the Star and Crescent, which is meeting with much favor. The movement is made by machinery, the parts being interchangeable, and the case is of nickel. It comes both in ladies' and gentlemen's sizes.

Mr. A. W. Kipling, of the firm of E. E. & A. W. Kipling, was one of the passengers on the ill-fated steamship *Oregon* which sank off Fire Island, last month. Mr. R. A. Kipling, was also on the same steamer. Both gentlemen lost all their baggage; as did all other passengers.

At a recent meeting of the Philadelphia members, the National Jobbers' Association there resolved to sell goods only to legitimate dealers, and to send goods on memorandum to principals only, thus cutting employees who have been in the habit of getting goods in this manner.

Messrs. Fowler Bros., manufacturers of English Crape Stone Jewelry, have removed from 194 to 176 Broadway. Their goods have achieved a popularity that is really marvellous. With their customary enterprise, the firm is constantly bringing out new designs, and adapting this form of jewelry to the popular demand for mourning goods.

The L. & S. 14-k. raised gold ornamented and fancy engraved cases, manufactured by Lissauer & Sondhiem, are meeting with great success, apparently meeting a special demand in the trade. They also offer full lines of diamond jewelry, and staple goods in great variety.

Mr. A. L. Farrington, who has been connected for so many years with Le Boutillier & Co., of this city, has made an engagement with Mr. Leon J. Glaenger, of Paris and New York, importer of clocks and bronzes. He will be happy to see his friends at the New York agency, 27 Chambers street.

Mr. J. S. C. Schott, formerly superintendent of the factory of Howard & Son, has formed a partnership with George Cahoon, who has been traveling in the West for Foster & Bailey for several years. They have bought the factory of Hunt & Owen, in Providence, of which they are to have possession April 1st.

Attention is directed to the illustrated advertisement of the Towle Manufacturing Company, of Newburyport, Mass. They show new and desirable patterns of flat ware, of which they make a specialty. This company also has an office at No. 149 and 151 State street, Chicago, which is under the management of Mr. Todd.

In the latter part of February the jewelry store of W. M. Montague, at Ozark, Ark., was robbed of about \$300 worth of goods. Soon after a young man was arrested at Fort Smith, and being charged with the crime he made admissions implicating some persons in Ozark who were arrested and the goods recovered.

Critzer Brothers, of San Antonio, Texas, had their stock injured by fire and water early last month to the extent of about \$3,500 and their machinery was injured about \$1,500. The fire originated in a restaurant next door. Their stock of watches and fine jewelry in the safe was uninjured. The loss was only partly covered by insurance.

The E. Howard Watch and Clock Co., having discontinued the manufacture of the 16 and 18 size gilt plain regulator stem wind and stem set movements, their entire stock of these grades have been secured by Oppenheimer Bros. & Veith. The manufacture of all other grades of Howard movements will be continued the same as heretofore.

The exports of gold for the month of March were extremely large, being over \$5,000,000 for the week ending March 20. The total exports of gold since January 1, amount to nearly \$20,000,000, as against \$7,200,950 in the same period in 1885, and \$14,685,000 in 1884, while in 1883 the amount exported from January to April was but \$4,017,410.

The New York branch of the National Association of Jobbers held a meeting early last month, when Mr. Smith, of the firm of Smith & Knapp, was added to the executive committee, and all the old members were re-elected. The committee now consists of Messrs. Goddard, Keller, Marx, Oppenheimer, Scott, Simmons, Smith and Untermeyer.

We have heretofore called attention to the elegant painting on exhibition at the store of Mr. Charles W. Schumann in John Street. The number of visitors was so great that he was obliged to charge twenty-five cents admission, the proceeds to be divided among charities in New York and Brooklyn. The amount thus far realized and distributed is about \$2,500.

We announced in the March issue of THE CIRCULAR that there were signs of trouble brewing between a well known case manufacturer and the National Association of Manufacturers and Jobbers. It gives us pleasure to state now that the impending difficulty has been satisfactorily arranged, the mediation of disinterested parties having brought about an understanding that is mutually acceptable. The goods of the manufacturer in question are now being handled by dealers precisely as they were before the misunderstanding. It is probable that the trouble in this instance, and the action taken in connection with it, will have a salutary effect upon all familiar with the facts.

Mr. H. F. Atkinson, of the firm of Atkinson Brothers, Philadelphia, has severed his connection with that house, but has taken the Baltimore store formerly maintained by the firm, and will hereafter conduct a wholesale and retail business under the firm name of H. F. Atkinson & Co. The Philadelphia house will be continued under the old name of Atkinson Brothers, but will only do a wholesale business.

A regular meeting of the Travelers' Association was held at the Morton House, in this city, on the evening of March 13. Several new members were admitted, and the regular routine of business transacted. Letters were read from several members of Congress promising their support to the bill now pending in that body, intended to abolish all laws imposing a special license tax on commercial travelers.

Joseph Fahys & Co. have issued an elaborate catalogue of cases manufactured by them. It is profusely illustrated, showing the different styles of case made by this enterprising firm. Among them are their numerous designs, initials and special subjects. These are initials and designs in gold on a back of silver, and include trade emblems, hunting, fishing and various sporting designs. They are very popular in the trade.

An effort is being made through the Board of Trade to correct some of the abuses of which nearly every one complains. A paper presented for signature sets forth that the signers are in favor of changing the practice regarding: 1—Prepaying expressage; 2—payment of telegraph orders; 3—taking back goods already charged; 4—uniform time on goods sold; 5—rebates and other reclamations. Many members are attaching their signatures to this document.

The Gorham Manufacturing Company present in their very elaborate advertisement in this issue, an illustrated page. Their reputation for the manufacture of fine goods is so well established, that it suffices to say that they lead the styles in their varied lines of goods, in the preparation of which they spare neither labor nor expense. A large corps of artists and designers is in their employ constantly preparing novelties for the trade, and the designs they present are all original with them.

A mock auction operator, going by the name of Henry Roth, recently came to grief in Minneapolis. He tried the mock auction dodge on an innocent Swede; and when the guileless foreigner refused to buy the brass watch offered, the gang took him into a back room and by threats compelled him to give \$20 for the worthless thing. He complained to the police, who arrested Roth and exposed the character of his business. It is not thought he will trouble that part of the country again.

While some workmen were engaged in moving a safe for Mr. John Holland, of Cincinnati, the well known gold pen manufacturer, they removed two barrels of sweeps that were in their way to the sidewalk. Immediately their backs were turned, a garbage gatherer came along, seized upon the barrels and dumped them into his cart. In a short time the sweeps had joined the street sweepings in the common dumping ground and were lost beyond recovery. Mr. Holland estimates his loss by the unusual zeal of the garbage man at about \$500.

H. Muhr's Sons, of Philadelphia, have removed to their new building, at the northwest corner of Broad and Race sts., the finest thoroughfare in the city. It has a frontage on Broad street of 100 feet, and 150 feet on Race street, facing north. It is 6 stories high, with half basement, has 3 towers, and in the corner tower is one of Howard Watch and Clock Co.'s fine illuminated tower clocks. The building is built in the shape of the letter E, windows all around and has a floor space of 12,000 square feet. Has 3 elevators, one for passengers and 2 for freight. It will be lighted by electric light. The building is occupied by their watch case and jewelry manufacturing departments, which greatly increase their facilities for producing their specialties. All the new improved machinery will be brought in use.

A few weeks ago Frank Davis made his appearance in Babylon, L. I., and gained the confidence of Frank S. Baird, a jeweler there, At Davis' suggestion Baird bought a horse and carriage and fitted him out with \$1,500 worth of jewelry, watches and clocks to canvass the towns from there to Sag Harbor on commission. Davis reported good business and got as far as Moriches on his return, when he suddenly left that place taking with him the proceeds of his sales and what jewelry remained.

The well known jewelry firm of Roehm & Wright, of Detroit, has been dissolved, R. J. F. Roehm retiring. The business will be carried on at the old stand under the firm name of Wright, Kay & Co., Hon. Jacob S. Farrand being the special. The junior member of the firm, Mr. John Kay, has long been identified with the old house of Roehm & Wright as chief clerk and buyer, and brings with him the experience of many years spent with other houses in the various departments of the jewelry business. Mr. Wright is well known in Detroit and the West.

The difference between the Knights of Labor and the Dueber Watch Case Mfg. Co., of Newport, Ky., reached a final settlement during the past month at a meeting between the General Executive Board of the Knights of Labor and Mr. John C. Dueber. Articles of settlement were signed by both parties, in which it was agreed that the boycott upon the watch cases is to be removed and the old employees re-employed, and in future no discrimination will be exercised against the Knights of Labor. Children under fifteen years of age will not be employed in the factory at Newport. The best of feeling prevailed during the session.

Mrs. E. D. Morgan, wife of the late Governor Morgan, was a passenger on the steamship *Oregon*, that was sunk off Fire Island recently. She had with her about \$30,000 worth of diamonds, which she was forced to leave in her state room. A diver who was sent down to examine the wreck succeeded in entering her state room, and found her trunk, satchel and other baggage. He released it so that it floated to the surface, where it was secured by the wrecking crew. It is stated that the diamonds were subsequently returned to Mrs. Morgan in good condition and all accounted for, but the report lacks confirmation, and is problematical.

Mr. Aaron Carter having resigned the presidency of the Trenton Watch Company, Mr. J. H. Brewster, of Trenton, was, at a recent meeting of the directors of the company, chosen to fill the vacancy. A site for the new factory of the company has been selected, and on this a four story brick building is to be erected. The plans have been decided on and are now in the hands of the architect. The capital stock, which was fixed at \$150,000, has all been taken, mostly by residents of Trenton, who are anxious to secure the New Haven plant in their midst. They propose to make movements of medium grades, and are confident of success.

Representatives Collins of Massachusetts and James of New York called a meeting of the leading advocates of the Bankruptcy bill, at Mr. James' house, March 29, for the purpose of arranging a plan of operations to secure the passage of that measure. Among the Representatives invited were Messrs. Seymour of Connecticut, Bynum of Indiana, King of Louisiana, Finley of Maryland, Maybury of Michigan, Glover of Missouri, Cox of North Carolina, Sowden of Pennsylvania, and Culbertson of Texas—Democrats; and Messrs. Dunham of Illinois, D. B. Henderson of Iowa, Reed of Maine, Ranney of Massachusetts, Strait of Minnesota, Dorsey of Nebraska, Haynes of New Hampshire, Buchanan of New Jersey, Butteworth and E. B. Taylor of Ohio, Pettibone of Tennessee, and Caswell of Wisconsin—Republicans. These gentlemen are all heartily in favor of the Bankruptcy bill, and have been making a canvass of the delegations from their respective States as well as among the members generally. The bill was made the special order in the Senate for March 31, but it was doubted if it could be reached at that time. There is no doubt about its passage by the Senate, and its friends in the house are very hopeful.

An Englishman giving the name of Arthur Lilly, has been victimizing the people of Bentonville, Ark. He stopped at the hotel, and represented that he was one of the proprietors of the National Watch Company, of Elgin, and said that he proposed to locate a branch of the works in Bentonville. He was cordially welcomed, and promised substantial assistance in his enterprise. He claimed to have plenty of money, and exhibited what purported to be drafts amounting to nearly \$50,000. He selected a site for his proposed factory, had the deeds made out, but failed to have the money forthcoming on time. He finally committed some petty offence, was arrested and his true character exposed. At last accounts he was in jail for lack of \$750 bail.

A Cincinnati merchant recently sued a mercantile agency for damages because it had given him an erroneous rating. The defence made by the agency was that the merchant had refused to give any information as to his standing, and that they had made his rating from information gleaned from other parties, without malice, but with an honest desire to serve business interests. The Superior Court sustained the defence, and the merchant lost his suit. It would appear from this that it is held to be a matter of public interest that every business man should furnish these agencies with his rating, whether he is seeking credit or not. It is scarcely probable that the higher courts will sustain this doctrine. It is getting so that nothing is private, either in one's business or domestic relations.

According to a newspaper report, speculators in Milwaukee are excited over the alleged discovery of diamond fields in the township of Wayne, Washington county. Recently, as stated, just after the thaw that cleared away the snow, a farmer's boy picked up in a gravel bank an opaque pebble, somewhat larger than a walnut. It was brought to Milwaukee and placed in the hands of a diamond expert, who, after the usual tests, pronounced it a twenty-two karat diamond. It is shaped like a pear, smoky in color, and is the largest diamond ever found in Wisconsin. Several years ago a fifteen karat stone was found at Eagle, Waukesha county, thirty miles west of Milwaukee. A general impression that the mine was "salted" prevented it from being worked. The fact that the two localities are in the same general range leads experienced diamond miners to believe in the possibility of mining to advantage in the vicinity. The rough diamond is worth \$225. Where that "diamond mine" will turn up next is a mystery time alone can solve.

A firm of prominent manufacturers of Newark have been making lockets out of gold and silver coin that were not only very ingenious but attractive and popular. They cut away portions of the coin, fitted it with hinges and a spring, so arranged that it would hold a photograph, the locket when completed being worth considerably more than the coins used in its manufacture. Officers of the secret service, however, claimed that this was a mutilation of United States coin in violation of law, and on their representations the Secretary of the Treasury enjoined the manufacture of the lockets. While this use of coin may be a technical violation of the law, there was no intent to deceive in connection with it, for the pieces used were robbed of their value as coins and simply converted into articles of personal adornment, the labor and ingenuity put upon them increasing the value of the metal several fold. It is possible that the Secretary of the Treasury may reconsider his decision, and permit the manufacture of these unique lockets to be continued. Uncle Sam, however, is very jealous of the coin bearing his stamp, and is always suspicious of anyone who takes any liberties with it; he is willing to make a coin worth eighty cents and call it a dollar, but if anyone takes that same coin and, by skill and labor expended upon it, make it worth five dollars as a work of art, he is sure to enter an objection.

Every watchmaker or repairer knows what an important part good watch oil plays in making his labor successful; without good oil he cannot make his work satisfactory. The finest oil is obtained from the head and jaws of a small whale, but the particular species of whale most sought for this oil has been quite scarce of late. During last season, however, quite a large school of them was driven upon the coast of New England, many of them becoming scattered and driven into small inlets, where they fell a prey to the fishermen. William F. Nye, of New Bedford, who has long made a specialty of the manufacture of fine bleached watch oil, was promptly on hand, and made arrangements for securing the oil taken from the head and jaws of the captured fish. By this means he obtained a large quantity, which he refines by his peculiar process, whereby he produces an oil that is very highly commended by all who have used it. He guarantees that it is pure, and adapted to any climate.

That was pretty sharp practice on the part of the officers of the steamship *Fulda*, claiming salvage on the diamonds that the purser of the *Oregon* rescued from that vessel as she was sinking recently. The diamonds were consigned to half a dozen different importers, and had been placed in the special custody of the purser. When he had to leave the ship he took the diamonds with him, and on reaching the *Fulda* reported to the captain that he had them. The captain entered them on the books as "picked up at sea," and when the *Fulda* arrived in port he and the purser filed a claim against them for salvage. If anyone is entitled to salvage it is the purser of the *Oregon*, who saved them after his ship had been abandoned at sea. If it can be shown that the vessel was lost by the act of God and not through carelessness, her owners will be relieved from all responsibility for damages, and the insurance companies will have to stand all damages sustained by the owners in payment of salvage.

The several consignees of the parcels of diamonds which formed a part of the lost *Oregon's* cargo were put in possession of their goods March 20, bonds having been given in order to effect their release from the custody of the United States Marshal, New Jersey District, by whom they were seized on the libel for salvage filed by the North German Lloyds Steamship Company, owners of the *Fulda*. Three of the consignees, Messrs. Hedges & Co., Smith & Knapp and Alfred H. Smith & Co., were insured in the Marine Insurance Co., of London, whose managers cabled immediately on hearing of the disaster to their representatives in this city, Messrs. Chubb & Son, to take all necessary measures to protect the interest of their clients. Messrs. Chubb & Son accordingly procured the release of the diamonds insured in the Marine by giving the bonds of that company to pay any amount of salvage ultimately found due to the owners of the *Fulda* for bringing the precious stones into port. They do not, however, admit, but distinctly deny, that any salvage is due, claiming that an essential element of a salvage claim, the intention to save, is wanting. The largest consignment, which was to M. Fox & Co., importers of diamonds, of Maiden Lane, gave rise to a further complication. In their case the underwriters took no measures for the release of the goods, and M. Fox & Co. delaying to do so, the *Fulda* was about to sail, carrying the diamonds away with her. Here Collector Hedden interposed, and refused to grant a clearance without entry and payment of duty on the stones. Finally, they consented to give bonds, and the diamonds were surrendered and passed through the Custom House into M. Fox & Co.'s possession. The claim of the owners of the *Fulda* for salvage rests upon the fact that the purser of the *Oregon*, with the diamonds in his possession, was taken on board after the disaster, and that the diamonds were deposited in the *Fulda's* safe. It is also claimed that a receipt was asked and the property thus fully placed in the custody of the *Fulda's* owners. If a salvage is allowed, the underwriters, and not the owners of the stones, will have to pay the award, as that risk is covered by the policy. The question is whether the case is one for salvage allowance is therefore one between the underwriters and the North German Lloyds.



VOLUME XVII.

NEW YORK, MAY, 1886.

No. 4.

THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 189 Broadway, New York.

Advertising rates made known on application.

The Business Outlook.

IT CANNOT be said that the outlook for business at the present time is particularly encouraging. For the past three years there has been an unusual depression in all lines of business, owing to the unsettled condition of the financial elements following the partial panic of 1883, when Grant & Ward and several banks failed. That was so nearly a great panic that capital and enterprise called a halt for a time, that the country might have time to recover. The shrinkage in values that occurred during this period of depression was something enormous in amount, and the only wonder was that we survived without a panic. But gradually confidence was restored, business began to revive, and 1886 opened with a promise of an unusually prosperous season. All the conditions were favorable; during the dull seasons dealers had been going through a process of liquidation, buying few goods but paying off their obligations as fast as possible, and in every way preparing themselves to take advantage of the good times when they should come. When the year opened, the stocks of dealers were very low, their indebtedness much reduced, and they were prepared to order liberally on the first indication of an active demand. The early orders of January and February were sufficient in volume to greatly encourage manufacturers, and they prepared to meet an active spring trade. Then in March came the great labor strikes on the western railroads, in the coal regions and in various industrial centers, assuming such proportions and such a threatening appearance as to discourage the most sanguine. For weeks the railroad strike was maintained, all the rail-

roads centering in St. Louis being at a standstill, and no freight moving out of that city either West or South. All kinds of business virtually came to a standstill, and the whole country became interested in this gigantic struggle between labor and capital. The unreasonableness of this strike, and the extravagant and alarming threats of those conducting it, appalled every one, and no one could say to what lengths it might be carried. Enterprise lay prostrate at the feet of unreasonable labor, and capital turned from its legitimate channels and sought safety in securities that could be placed beyond the influence of dissatisfied and reckless workmen, whose usual good sense had given way to the impracticable schemes of restless agitators. The bright business prospects of the previous few weeks were suddenly obscured by this demonstration, so little anticipated, and a period of dullness succeeded where a season of activity had been looked for. Dealers were afraid to order goods, and manufacturers were afraid to trust them on the railroads, while the railroad officials were reluctant to accept goods on any terms. On all the lines of road affected by the strike, business men had all they could do to watch the contest, fearful lest it should take on the form of riotous demonstrations and so further embarrass them and add new perils to the situation. In many localities there were outbreaks of violence, and it may be said that the peace and quiet of the whole country were disturbed by this labor contest. That what promised to be a prosperous season and partly redeem the stagnation of previous years has been converted into one of exceeding dullness and inactivity, is due entirely to the unwise and injudicious course pursued by the Knights of Labor. While these strikes are temporarily embarrassing to capital and to trade generally, the effect has already been to throw many laboring men out of employment, and thousands more will be eventually deprived of their opportunity to earn their living in consequence of it, so that in the end labor will be the greatest sufferer for the excesses committed in its name.

While these labor demonstrations continue to threaten all industries there can be little hope for general prosperity. All business enterprises are interdependent, and one cannot suffer serious disaster without involving all others to a greater or lesser extent. The blockading of the transportation facilities of five States for a period of over a month was a national calamity, that cannot but be felt for months to come. But worst of all is the uncertainty as to what phase this same spirit of dissatisfaction may assume next. It is possible that with the return of the railroad strikers to work, and the failure of their leaders to secure what they demanded, workmen may be so disgusted as to break up the organization of the Knights of Labor, and thus restore confidence in them once more. If this should be done, it is possible that there may come a business revival this fall that will fulfill the promise of the early spring. We certainly hope this will occur, for we firmly believe that the threatening attitude of labor is the only obstacle in the way of a season of unusual activity in all lines of business. All the conditions that existed in the early part of the year to make every one so sanguine still exists, and if a permanent peace between labor and capital could be arranged, the

good times so long predicted would speedily follow. Sensible working men will scarcely follow blindly the leadership of impracticable and reckless agitators when the folly of so doing is brought home to their pockets and to their families. We do not, however, look for any improvement in the business outlook until there comes a settlement of the labor troubles on a basis that will permit employers to make contracts ahead, and arrange their business with a view to supplying a future demand for their products. At present they are running their workshops and factories on the hand-to-mouth principle, being afraid to take any chances for the future lest their employees leave them in the lurch at a critical moment.

Jobbers and Retail Dealers.

IT HAS ALWAYS been a matter of complaint among retail dealers that there were too many jobbers in the business, or rather, that there were certain retail dealers who were accorded special privileges by manufacturers whereby they had a decided advantage over the average dealers. This was one of the first subjects brought before the National Association of Manufacturers and Jobbers, and an effort was then made to do away with special privileges to retail dealers entirely. The proposition came too abruptly, however, to meet with unanimous approval at that time, as manufacturers could not change their plans so suddenly, but the subject was held under advisement, with the tacit understanding that the desired reform would be carried out at an early day. At a recent meeting of the Executive Committee of the Association it was ordered that hereafter no special privileges whatever shall be allowed to retail dealers, thus placing them all on an equality so far as buying goods is concerned. This is a fair and equitable thing to do, for the special discounts heretofore allowed to a few favored dealers gave them a decided advantage over their fellow dealers who were not fortunate enough to secure this favor. The committee also adopted a rule to the effect that no jobber will be permitted hereafter to sell a watch at retail for less than 25 per cent. profit, thus placing him on an equality, so far as retailing goods, with the regular retail dealer. On this basis the retailer will be able to hold his own against these jobbers who also run retail establishments, or who work up retail trade among a large circle of personal friends.

In adopting these rules, which have the full effect of having been indorsed by the Association, the Executive Committee gives proof that the promises made by the Association at the outset are being redeemed as fast as circumstances will permit. The grievances of the retail dealers have been fully canvassed and are thoroughly understood; but the Association had to creep before it could walk; had it entered rashly upon reform methods without taking time to consider all the interests at stake, it would have defeated its object by destroying the organization at the outset. After feeling its way cautiously, it has been able to see just how far it could go in any given direction without introducing discord that should lead to disintegration; it has made haste slowly, being sure of its ground as it went along. As a consequence it has been of great service to manufacturers, jobbers and retail dealers, having adopted various rules in the interests of the entire trade, and abstaining from legislating in favor of any particular class. Retail dealers can feel that this Association is essentially friendly to them, recognizing to the fullest extent the position and rights of the retailers, and the dependence of the manufacturers and jobbers upon those who come in immediate contact with the consumers; whatever grievances the dealers may have against those who make and sell them goods will receive respectful consideration at the hands of the National Association, and where a remedy can be applied, it may be taken for granted that it will be in good time, not hastily or imprudently, but after a careful consideration of the subject in all its bearings. Some retail dealers

have been prone to censure the Association for not having made radical changes at once, forgetting that revolution is the natural product of radical measures, and when such are attempted in commercial transactions demoralization is liable to follow the dissatisfaction engendered by them. Davy Crockett's motto, "Be sure you are right, then go ahead," is a safe one to follow when wrongs of magnitude and extended ramifications are to be contended with. The National Association, by its moderation, extreme caution, and manifest fairness, has been able to accomplish things that were declared to be impossible, and that would have been had they been attacked in a spirit of aggressiveness. The recent action mentioned above will be fully appreciated by the entire retail trade who have suffered from the abuses thus remedied.

Logical Results of the "Boycott."



THE ADOPTION by labor organizations of what is known as the boycott, as a means of intimidating employers, is something of comparatively recent date. When the order is given to boycott a manufacturer, merchant or other person, it is understood that every person owing allegiance to the authority issuing the order will do all in his power to injure the business of the person against whom the decree has been issued. In recent instances, cigar dealers have been notified not to buy cigars made by certain manufacturers, and when they persisted in doing so, their patrons have been warned not to buy of them; boarding-house keepers have been boycotted for harboring men who had taken the place of strikers, and tradesmen warned against selling anything to the boarding-house proprietor; merchants have been ordered to sell no goods to persons who have taken the place of strikers, and even milkmen have had their customers driven away from them for a like offense. In some cases where an employer has refused to yield to the demands of his workmen, the boycott has been applied to him, and every tradesman in his town directed to refuse to sell him goods on pain of having the boycott applied to them. Intimidation of this kind, taking the form of a combination to injure an individual, is a conspiracy in the eyes of the law, and the authors of it incur severe penalties. But the authors are careful to keep in the background, so that it is almost impossible to find anyone to prosecute. Workingmen can hardly have thought out what must be the result of the boycott if carried to its logical conclusion; if they would but stop to think for a few moments, they would hesitate to employ a method that is not only unlawful, but can be made to work so disastrously to them. A little of the recoil is being manifested in this city. The recent "tie-up" of all the street railroads, because the managers of one of them refused to yield to the demands of the strikers, showed the managers that they must organize for mutual protection, and it is reported that they have done so, and propose to meet strike with strike, boycott with boycott. Having agreed as to the rate of wages to be paid and the hours of labor, they propose to yield no further, but if a strike is made upon one road, to "tie-up" all roads, discharging every employee, and closing their roads against every man until the strikers resume work; the authors of boycotts are to be themselves boycotted, by being refused employment upon all roads for all time to come. The names of agitators or disorderly employes are to be kept in a black list, of which all companies will have a copy, so that the boycott will be applied to them whenever they apply for work. It is stated that Jay Gould was sustained in his resistance to the demands of the Knights of Labor by the managers of all the leading railroads of the country, who saw that if he yielded they would probably be attacked next. The manufacturers of shoes in New England have combined to resist the unreasonable demands of their employees, and there is talk of their making an aggressive war on their late workmen by refusing them employment in the future.

Whether this be done now or not, such a result must inevitably come if the workmen continue to employ the boycott and other means of intimidation to ruin their business. Employers will, as a means of self-defense, be compelled to organize and adopt every method to protect themselves that labor employs to injure them. If they are forced to resort to the boycott, they can make life very uncomfortable to strikers, taking their credit away from them, even depriving them of the houses they live in, and making it impossible for them to obtain employment at their trade anywhere. Capital is always more powerful than mere personal influence, and if it combines in any particular branch of industry against the workmen in that branch, it will be hard lines for the latter. Yet this is precisely what the Knights of Labor and kindred organizations are driving employers to.

The right of employees to combine cannot be questioned; nor can the right of an individual to accept or decline to work be denied; but all men have these rights in common, and when strikers or labor organizations undertake to prevent men from working in places where they refuse to work, they are trampling upon individual rights in a manner that cannot be tolerated, even if the strong arm of the general government has to be appealed to. When labor resorts to threats, intimidation, or applies the boycott to prevent an employer from contracting with an individual for his labor, it is denying to others a right it claims for itself, a right that must be maintained at all hazards; it strikes at the very foundations of society and proposes to tyrannize alike over capital and labor. We are unwilling to believe that a large portion of employees in this country will, upon mature reflection, continue to support these arbitrary, unjust, unlawful and revolutionary features of their organizations. They have too much respect for that individual liberty which is their birthright to become willing parties to a tyranny that is subversive of society, and must, if unchecked, involve all classes in ruin and suffering. After the consciousness of power arising from the rapid development of their organization will come a sense of responsibility and of a desire to protect themselves from the consequences of excesses forced upon them by the reckless and irresponsible ones of their numbers. Already many of the more respectable members of the Knights of Labor are repudiating the action of some of their hot-headed leaders, who have precipitated strikes and conflicts without sufficient cause, and it is to be hoped that the time is not far off when the cool, wise counsels of the large majority of respectable workmen will have its proper weight in their various organizations, and that no more such usurpations of power by ignorant leaders as have recently occurred will be permitted in the future. Unless wisdom and prudence are placed at the helm in labor organizations, and all methods of intimidation abandoned, combinations of capital, such as we have indicated, to oppose and boycott them are inevitable.

Expenses of Bankruptcy.



CONGRESS has not made as much progress with the bankruptcy bill as its friends had hoped for, but there is a prospect that it may become a law before the final adjournment. One of the objections to the old bankruptcy law was the cost, the fees permitted to be charged under it making it an object to the officials to prolong the settlement. No one but a lawyer and his victims know the possibilities of a long fee bill, although there are many in the trade who have seen a debtor's estate consumed while the creditors received only the most meagre dividends. In the Lowell bill the long list of fees formerly allowed the register is entirely abolished, and the Commissioner in Bankruptcy provided for is to receive the modest salary of \$1,000 a year and \$15 for each case. The following are the additional provisions regarding cost in the pending bill:

SEC. 16. That every party, debtor or creditor petitioning for adjudication of bankruptcy, shall, at the time of filing such petition, pay \$50 to the Clerk of the Court, and \$10 to the clerk in lieu of all fees, except as hereinafter permitted to be charged. (This refers to Sec. 17 allowing him to charge for copies of papers ordered for private use). "Every trustee shall pay to the clerk 1 per cent. of the gross amount of money realized from the assets in excess of \$500, and every debtor making a composition shall, in like manner, pay one-half of one per cent. upon the total amount paid by him in such composition."

The fee for any required oath, when not taken on a hearing, or before a Federal judge, or Commissioner in Bankruptcy, is 50 cents. The costs of involuntary proceedings in bankruptcy which have proceeded to adjudication may be paid out of the assets to an amount not exceeding \$200, if the court shall so order.

Probably the most important feature of the pending bill is related to the fees of assignees. These officials are to be known as trustees, and are to be appointed by the creditors, except that in cases where the estate does not exceed \$1,000, the Commissioner must himself act as trustee. The provision for compensation is as follows:

SEC. 69. That the trustee shall be allowed, from the assets in his hands, all his necessary disbursements, and such reasonable compensation for his services, having regard to the circumstances of the case, as shall be allowed by the committee of direction, or if there be no committee, by a majority in value of the creditors, and in default of such allowance, by the Commissioner, not exceeding the rate of compensation allowed for similar services by the Probate Court of the State in which the proceedings are pending; and the allowance shall, in all cases, be subject to the decision of the District judge and the supervision of the Circuit Court. Where the Commissioner acts as trustee the allowance shall be made by the judge.

These provisions give to the Lowell bill, as amended, the appearance of an economical measure, and it is under this impression that it has gained a large amount of favor in commercial circles.

The Commercial Travelers' Bill.

To the Editor of the Jewelers' Circular:

Would you allow me the use of your columns to bring to the attention of the business community and public in general a bill now before Congress which is of vital importance to our inter-State commerce. The bill I have reference to is known as H. R. 1,621, or the James bill, and was introduced by the Hon. Darwin R. James, of Brooklyn, on January 5, of this session, the XLIXth Congress. It was read twice, referred to the Committee on Commerce and ordered to be printed. The bill reads as follows:

A bill to regulate commercial sales of goods and merchandise by samples, catalogue, card, price list, description or other representation between residents of the several States and Territories. Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that residents of each State and Territory may, within the other States and Territories and within the District of Columbia, solicit from dealers or merchants orders for goods and merchandise by sample, catalogue, card, price list, description or other representation, without payment of any license or mercantile tax.

The originator of this bill is the Travelers' Protective Association of the United States, and it has the support of both the local and State association. The Travelers' Protective Association of the United States was organized June 24, 1882, to embody the thousands and thousands of traveling men of the country—roughly estimated at 250,000. The headquarters of the organization are at Chicago, and the sub-associations in the various States.

The New York City Association has for its President Mr. John F. Henry (John F. Henry & Co., drugs); Messrs. John De Witt and Nathaniel Jay Rice, Vice-Presidents; Messrs. Dorsey P. Ellis and C. M. Freeman, Secretaries; and Mr. N. B. Abbott, Treasurer. The meetings are held at the Morton House. The local association was first in indorsing the James bill, and through its legislative committee, several of whom have visited Washington to further the interest of the bill, has used all honorable means to have the bill reported favorably and passed by the House. With the possible exception of one, I believe the New York State delegation of thirty-four members in the House will support the bill, and from several letters now in my possession from members, indications point to the belief that they

will do all in their power and use their influence to make the bill a law. The bill sprung from the local association, and the 60,000 commercial travelers of this city believe this bill should be passed.

Because such taxes are unconstitutional, in preventing and hindering commerce among the States; because they are against public policy, in that they tend to restrain competition and make both dealers and consumers pay higher prices for their goods; because they are unjust, as in some instances they permit the travelers of one State or Territory to enjoy privileges not granted by that State or Territory to the travelers of other States or Territories (see section 4 of the Constitution of the United States: "The citizens of each State shall be entitled to all the privileges and immunities of the citizens of the several States;") because the traveling men of the country now number over 250,000, and reach in their journeyings every town and hamlet of this country; are the great distributors of goods, shipping about 300,000,000 tons out of 400,000,000 now carried yearly by the railroads; spending \$1,750,000 per day, or about \$382,000,000 per year (calculating nine months travel out of the twelve), which is distributed among carriers, hotels, shopkeepers and producers; and such license laws interfere with such distribution and necessarily interfere with the commerce of the whole country; because they are a relic of a barbarous age, when every village or tribe sought to levy tribute upon every other village or tribe, a state of things which, it was hoped, had received its final blow in this country when the tax of one dollar imposed by the State of New Jersey upon every person passing through it was done away with; because it is against the interest of the communities imposing such taxes, as is illustrated by the greater prosperity of other communities which have or do not now impose them.

Our intention is not to stop at this point even if the bill is passed; we shall then work, and are now using all possible efforts, to secure better hotel accommodations, commensurate with the prices paid, better railroad accommodations, cheaper rates of travel, and also to obtain an equitable and fair allowance of baggage. Should our efforts prove futile the business community in general will only be benefitted by our work. As we stand to-day some parts of the country are not visited by commercial travelers, as the impediments thrown in their way, such as local, county or State taxation and other unpleasantness, keep the merchants back from sending representatives to these districts.

This, in short, is the object of our association; we should be pleased to have business houses join us, not represented so far among our numbers. We also wish the press to help us, and to this end might I ask you, through your columns, to further the object of our association? Very respectfully,

NATHANIEL JAY RICE.

Member of Committees on Legislation and Press.

New York, April 10.

A Unique Old Watch.



THE FOLLOWING article was written by M. Ed. Sordet, director of the Geneva horological school, for the purpose of being delivered before a meeting of the horological society; other and more urgent matter, however, unavoidably prevented the delivery, and the gentleman handed it to the *Journal Suisse d'horlogerie*, for publication.

The lecturer, in his opening remarks, deplores the tendency of the present age, becoming more pronounced daily with both manufacturer and smaller tradesman of every class and kind, when beginning a piece of work, to principally direct their attention to the ultimate results—to the question of dollars and cents, likely to be reaped from it; this pernicious tendency, should, according to his opinion, be energetically battled against by every friend of art and progress. Our industry, especially, in order to maintain the envia-

ble position it occupies at present, is forced to avail itself of the assistance and the achievements of artists and inventors, past, present, and future, for the solution of problems apparently impossible to be solved, but nevertheless of so great an importance as to merit the full attention of all persons having the progress of our profession at heart.

How often do we not hear: Of what use is this work? What is it good for?

But, Messieurs critics, who you are so ready of scoffing at everything which does not at once fill your purse, please take the trouble of examining the matter a little closer. Remember the quantity of study and labor such works must have caused, which you so flip-pantly disdain; study them in their details, and if you possess any honesty, and the capacity of understanding their purposes, you will not fail to recognize that many among them contain fertile ideas, and often simply require trifling changes, in order to become powerful auxiliaries of progress and science.

In common with the painter, the engraver, the modeler, each of whom draws his inspirations from the marvelous treasures of engravings and paintings counting their ages by centuries and are remnants of the world of antiquity, preserved in collections, where they are admired by the tourist and the amateur, why should not also we be inspired by the ideas and works of our predecessors, and seek by visiting our museums, our collections, and studying our models to develop and extend the field of our knowledge? We will frequently learn how to avoid an error, and still more frequently how to improve the existing order of things and take a step in advance in the progress of the age.

The tendency complained of in the beginning of this article, exerts a pernicious influence upon every professional instruction, and especially upon that of horology, which, in order to be complete, requires great sacrifices of both time and money. It is, therefore, exceptional if in our profession the artisan succeeds in attaining at a sudden bound a rank suited to his talent, and, rarer still, to his genius; he is rather required to wait until years and incessant and conscientious labor permit him to assume the position and fill the place due to his talent and unflagging exertion. What a large number of such artisans there has been, and in the future there will be, both unknown and full of talent, who work enthusiastically for the perfection and advancement of horology, without any other hope than that of seeing their endeavors finally rewarded.

This may also, perhaps, have been the case with Gautrin, of Paris, whose piece of handiwork we will in the following examine in detail.

Our author next enters into local questions appertaining to the horology of Switzerland, which are irrelevant to the columns of THE JEWELERS' CIRCULAR, and we again take up the thread where he enters into the description of the watch.

Before I enter into an explanation of the watch, which is to be the subject of my discourse of to-day, I must state how this remarkable piece, which has since become the property of the museum of the horological school, came into my hands.

Last year there died at Geneva, M. A. Rilliet-de-Candolle, uncle of our professor of chemistry and physics, M. Albert Rilliet. The qualities, the deeds, the character, and the science of the deceased are doubtless well known to you, but what you perhaps do not know is that among the many curious watches left by him, there was also a very rare and original movement. Our professor was kind enough to present it to me, as a souvenir of his uncle. . . . I have surrendered without regret this interesting and most probably unique specimen of chronometric mechanism to our museum, now in the process of formation, hoping that my example may be imitated by a large and generous number of donors.

It is evident, gentlemen, that by giving you the necessary explanations for understanding the functions of this ingenious mechanism, I do not wish to convey the impression that I approve without reserve its conception and execution. On the contrary, I understand all the defective and strange complications enclosed therein, but on

the other hand, this piece of work must have cost many researches and any amount of trouble to its maker.

Gautrin, it appears, lived about the end of the last century, and it would be interesting to know whether his work was fully understood by the National Institute to which it was presented about 1790. M. Rilliet has unsuccessfully searched among the papers and writings of his uncle for historical documents explaining the different questions.

The piece, at the time when presented to me, was in a deplorable state, and if you see it in going order to-day, you may ascribe it to the skill of M. Emile James, who repaired it. He had to spend many an hour, not to comprehend this curious mechanism, but to re-establish harmony between its different parts, which were in complete disorder.

The following is a description of this piece, while fig. 1 represents it to the eye :

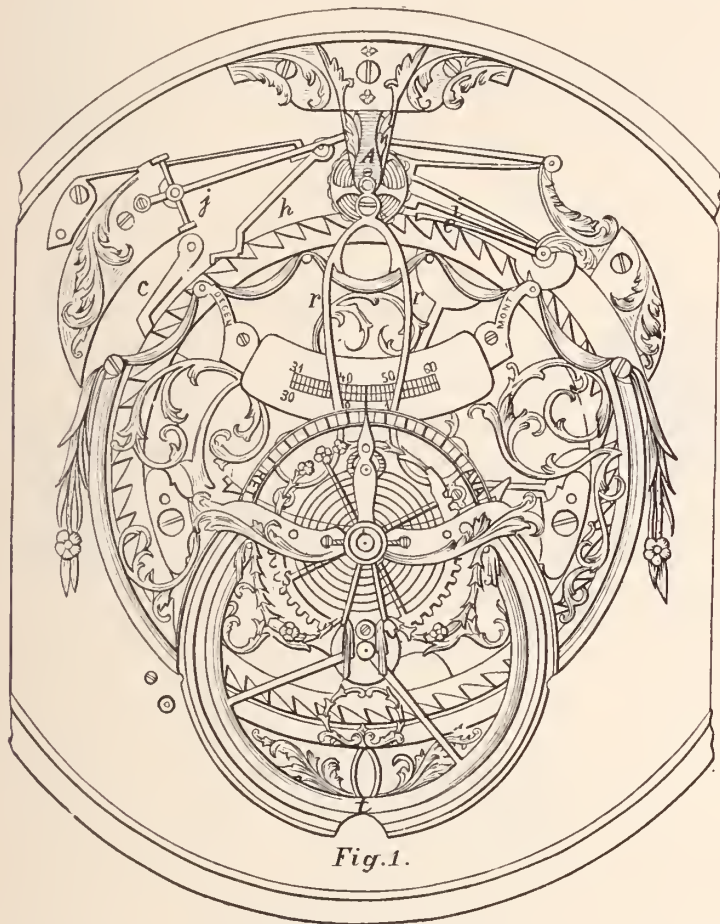


Fig. 1.

A large wheel of 60 ratchet-like teeth occupies the center of the plate ; it measures 33 millimeters in diameter ; its arbor carries two pinions, one of which, of 15 leaves, receives the impulse from a barrel by means of a fusee of 70 teeth ; the other pinion, of 10 leaves, actuates the motion work, which is composed of a wheel of 30 teeth, carrying a pinion of 10 leaves, which actuates a wheel of 40 teeth, upon which the hour hand is fastened.

The functions of the large wheel, which at the same time is the principal one, are of a four-fold nature.

In the first place, it operates upon a lever *a* (fig. 2) fastened at the upper part of a vertical axis *A* (fig. 1). This latter carries besides this an unlocking lever *b*, a small barrel, the core of which revolves with the axis in question, and a double rack *r* (fig. 1), provided with very sharply ratchet-shaped teeth, which stand over each other in an inverse direction. This axis *A* (fig. 3) also carries at its lower end (fig. 3) a conical disc *d* and a second rack provided with counterweight, whereby the axis with all its parts are in equilibrium.

The large wheel, in the second place, acts upon a lever *c* destined to raise the axis *A*—that is, to cause it to move in the direction of its length.

The wheel operates also upon a small lever *e* (figs. 1 and 2), which

again moves another lever *f*, carrying a conical gold disc *g*, for the purpose of causing the axis to descend again.

And finally the wheel stands in connection with a lever *h*, which restitutes the force to the large wheel at the moment when the action is stopped by the raising of the axis.

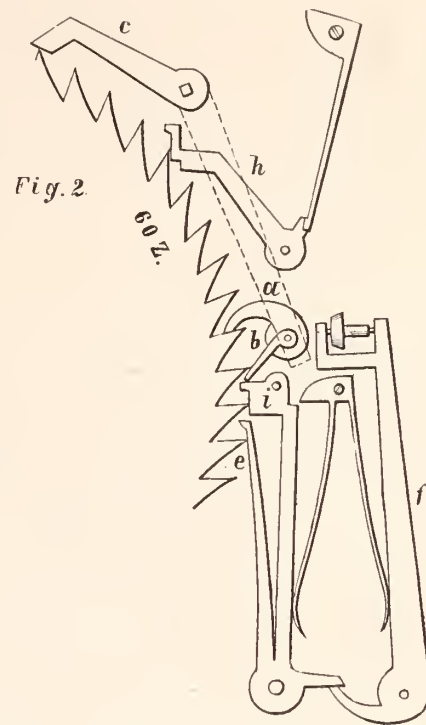
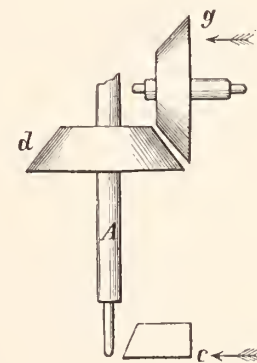


Fig. 2.

The double rack is nothing else than the double repetition of the scape wheel of the comma escapement ; in effect, the wheel operates upon two commas, fastened in an inverted direction to each other upon the same axis, which also carries a toothed semicircle *s* (fig. 1) depthing with the so-called balance staff *t*. The balance spring, however, is not fastened to the balance, but upon the axis of the two commas.

The small barrel is held fixed by an outer hook, in the latter of which again braces itself the extremity of a cardon joint *j*, (fig. 1), rendered necessary by reason of the vertical displacement of the axis.

Fig. 3.



Another piece, not yet mentioned, is the lever *i*, upon which the large wheel makes repose, and which stands in connection with the lever *f*, the support of the gold disc.

Now, the action of the entire mechanism is as follows : The large wheel receives the motive energy, and transmits it to the axis *A* by means of the lever *a*. During this action, the axis is raised ; the double rack operates upon the upper comma, and it moves from left to right, in the position of the figure ; it winds at the same time the small spring. Arrived at the end of its course, where it finds no more teeth, it drops off, and by this act, the lever *c*, which held the axis *A* raised up, finds room between two teeth, drops through the interval, and no longer retains the axis in its position. At the same instant, the gold disc *g* braces itself upon the incline plane *d*, borne

by the axis, and forces both to descend. The axis of the racks is therefore in its lowest position, the large wheel has fallen at the same time upon its repose lever *i*, in such a manner that there is nothing but the small wound spring which can furnish motive power in an inverse direction to the large motive force; this it does; the lower comma seized by the lower rack begins to act, and continues its action until the time when, arrived at the end of its course, the lower rack escapes. At this instant the unlocking pallet *b* raises the lever *i*, upon which the large wheel made repose. This last, finding itself unlocked, falls upon the large lever *a*; at the same instant (the lever *c* causes the axis to raise again, the upper rack finds itself in depthing with the upper comma, and the same performance is repeated.

New Pendulum Escapement.



EUROPEAN horological journals are at present extensively commenting upon and praising or criticising a new pendulum escapement, or, better said, a new arrangement of the old anchor escapement, as a free escapement for pendulum clocks, invented by a Western watchmaker. A glance at the accompanying cut will show that the watch anchor escapement has been arranged for giving impulse to the pendulum. The ordinary ruby pin, which in the former passes during every vibration through the fork notch, is here fastened to the extreme end of the pendulum. The black line sketch represents the pendulum at repose, while the dotted lines represent it at the time when it has arrived at its limits. We barely deem a description of the newly-arranged escapement necessary, its performance being fully explained by the cut.

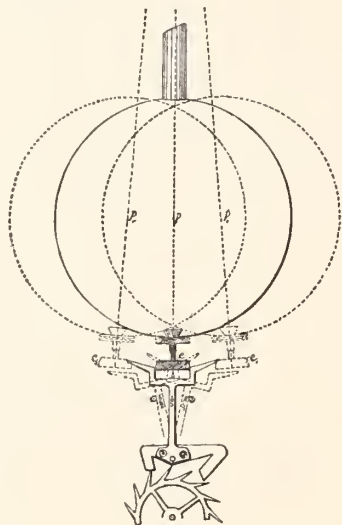


FIG. 1.

The inventor doubtless arranged this escapement for clocks in which, for purposes of decoration, the movement is placed underneath the pendulum—for instance, where a figure holds it. It is undeniable that, in this combination, this new arrangement possesses several important advantages over the old, to which also pertains the most important one—that it can be manufactured at a greatly inferior price. The inventor, in his specifications, claims important technical results, the escapement being placed underneath the pendulum, therefore near the center of gravity of the bob—which, however, is not unconditionally necessary—little power only is required, and the impulse need only be very feeble. This is an erroneous opinion, which was during his time also shared in by the famous steeple-clock maker Mannhardt, who placed a figure alongside of the pendulum, which at appropriate instances imparted the impulse to the latter with its foot. Although it is true that the impulse operates far more intensely when, as in this new arrangement, it is communicated to the free end of the pendulum, in place of near

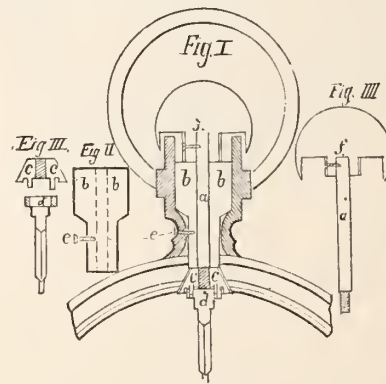
its point of suspension, and it is equally correct that a much smaller traction power is required for this new arrangement, than in ordinary escapements; but in the same proportion as the intensity of the impulse in this escapement increased, in the same proportion also will the irregular resistance in the unlocking, as well as in general all irregularities in the impulse force, be transported with greater intensity upon the pendulum, and the disadvantages accruing therefrom, are greater than the supposed advantages of this new escapement, and of others, of similar construction, that have preceded it. It is a well-known and well-established fact, fully confirmed by experience, that the disturbances, which the uniform rate of a clock sustains by the escapement, occur, not during the impulsion, but almost exclusively during the unlocking, and for this reason the best escapement will always be found to be that in which the resistances in the unlocking are constant as nearly as possible, and exerted with the least intensity upon the pendulum, while in the escapement under debate the very reverse is true.

To sum up, it is our opinion that this escapement is sufficiently well adapted for clocks, where, for purposes of decoration, the latter is to be placed underneath, but that it cannot be used for clocks of precision, and where there is no necessity of placing it at the bottom, it is best kept above near the suspension.

New Device for Rendering a Stem Winder Dust Proof.



MANY AND varied have been the devices suggested for making the stem winding apparatus dust proof. This is an important matter to the watchmaker at large, and whenever such a novelty has been brought out, we hasten to lay it before our readers—provided that it has acceptable features and is not excessive in price. The accompanying device, figs. 1, 2, 3, 4, appears to us to contain several preferable qualities. It is, by-the-way, invented and patented in Germany by a German watchmaker.



In figs. 1 and 2, *b* is a box or shell either firmly driven into the pendant, or retained in it by a screw *e*; *a*, figs. 1 and 4, are the upper part of the winding-post inserted in the box *b*, closing it both dust and air tight. The lower face of the push-button *f* rubs upon the upper face of the box *b*; *c*, figs. 1 and 3, is a connecting piece, screwed upon the winding-post *a*, and rubbing with its upper face against the lower face of the box *b*, whereby also at this place a dust and air tight closing is produced; *d*, figs. 1 and 3, is the lower part of the winding-post, the end of which, rubbing with its lower face against the plate and the barrel bridge, lays itself in the hollow of the connecting piece *c*, while the two pins, contained in the connecting piece *c*, seize into the notches in the head of the winding-post *d*, (figs. 1 and 3), and establish the connection.

The advantages of above device are by the inventor stated to be as follows:

1. Dust, humidity, and air are perfectly excluded.
2. The screw is done away with, by which, in European stem winding arrangements, the withdrawal of the winding-post is to be

prevented; it is well-known that this disposition causes many accidents and repairs.

3. The movement can be taken out of the case without the necessity of withdrawing first the winding-post; consequently the winding wheels are not disarranged—an advantage not to be under-estimated, especially for finer watches.

4. The friction of the push-button upon the outer edge of the pendant is dispensed with; this friction generally produces an important wear.

The inventor mentions several other advantages; we think the above mentioned are enough to enable the reader to form a judgment of its merits.

How to Put in a Cylinder.




COUNTRY GOLDSMITH, who says he has quite a fondness for repairing watches, and since he is the only craftsman who handles delicate tools in the neighborhood (in a Southern State), he is often called upon by his friends to set their "rattle boxes" "kicking," inquires of us how to put a cylinder in a Geneva watch; how to get the height and height of hair spring, and other data of interest to him. Being a subscriber, we don't mind telling him, condensing our answer as much as possible.

Take from the plate the balance and scape wheel, remove the balance spring from the cock, also the collet from its position; separate the broken part of cylinder from balance with care, and place it in a riveting stake. The hole should just receive the brass shoulder, and no more, or the balance may get bent. Use a suitable hollow punch, give it a gentle blow with a light hammer; it will thus easily be removed. Select your new cylinder, gauge it with the scape wheel, place the cylinder between two teeth; afterward place one tooth inside; in each case there should be a little shake if the proper size. Next take the old part just taken from the balance, and with the gauge measure from the notch (where it is generally broken) over the top pivot; if broken, allow for it, also a little for wear, rounding off, etc.; cut off the rest; measure from notch to seat for balance, and mark the new one; remove the cap jewels top and bottom, screw on the cock, and with the gauge measure outside from jewel to jewel for the entire length; fill up the shell of cylinder with sealing wax, making it warm near the flame with a spirit lamp, when well full, warm a plain brass ferrule, and place on the part just filled with wax; this will secure the ferrule, and the cylinder is not so liable to get broken. Take the lathe or pivot tool and center the top pivot by placing a file in a leaning position against the end, thus forming a nice point for the centers of the lathe. Measure from top pivot for the entire length of cylinder as measured from jewel to jewel; cut off bottom pivot to measure, allowing a little for centering, rounding up, wear, etc., in the lathe; take the pivot tool and center it on the top, making nice points. Place the cylinder in the lathe and commence turning the seat for balance, as marked in the measurement, with a nicely pointed graver; measure often, or try on the balance often when near the size required, making a nice fit (not loose), taking care to undercut a little. If the brass next the ferrule should be larger than the center of the balance, it may now be turned away a little. Place on the balance, and put it in the lathe, and with bow and graver mark at the edge of balance for the collet seat, remove the balance, and turn the seat for spring collet; this also should fit to a nicety, just tight, but at the same time movable when required; place on the collet and mark off the rest to be turned away, remove collet and undercut the body, or plug of cylinder at both ends. If the cylinder requires the body shortening at bottom it may now be done, afterward nicely undercut, and polish it out if you like. If the pivots are very large they must now be

reduced, and the pivots made near the size required with the graver, then finished and polished to the size of jewel holes with file or polisher. The pivots should be made to fit just free, not small; take care the pivots come through the jewel holes; round off the ends egg-shape; do not leave a burr on the end, but try it on your nail until it will not scratch.

Now boil out the wax; place the cylinder and ferrule in a copper blueing pan containing a little methylated spirit, hold it over a small flame of the spirit lamp, taking care that it does not ignite; let it boil a minute or two, and the wax will dissolve, and you have a clean cylinder ready for the balance.

Next observe the banking stud; if in the back or cock, the pin in the balance should be placed in front of the cylinder just opposite the stud, when the cylinder stands at rest; if the fourth pinion is used as banking stud, place the pin in the balance nearly at the back of the cylinder, place the cylinder in the riveting stake—the hole to receive the cylinder, freely (not large); take a half hollow punch expressly for the purpose, and a light hammer, commence riveting lightly, revolving the balance with your second or third finger of the hand you hold the punch with; a few light blows will secure it sufficiently. Place it in the calipers to see if the balance runs true, altering it as necessary; at the same time see that it is in poise—if not, take off a little from underneath with a small file, or chamfer out a little in the heaviest part. When properly in poise, the friction of a small file on the calipers will keep the balance revolving a considerable time; place on the cock and potance cap jewels, replace escape wheel, tie in the cylinder, place on the cock, and make any slight alteration required, place on the balance spring, and try your watch.

Next, suppose the broken cylinder to be lost; remove cock, potance, and scape wheel, gauge the new cylinder as before described with scape wheel, replace scape wheel, and make a potance as shown  in fig. 1, for the measurement, which will answer the purpose for almost any size watch. The slit *A* is for the screw to screw potance to the plate; the hole *B* is for the pivot to pass through, screw on a cap also to serve as end jewel. This must be screwed on in place of potance with the original screw.

Take the cylinder selected, place the blank pivot through the hole of the potance, and cut the pivot shorter until the scape wheel passes through the center of notch in the cylinder, allowing a little for centering, etc. Care should be taken to have this potance occupy the same thickness as the real potance of the watch, or the measurement will be wrong. The best way is to make a thin one, and pack it up to the thickness required on each occasion, mark the height for balance seat just above the escape cock, allowing for centering bottom pivot; take off cap jewels, place on cock and potance and measure for the entire length; fill up the cylinders with wax, and place on brass ferrule, center bottom pivot, and measure from bottom pivot to top pivot for the entire length of cylinder. Cut off the top to measure, and center it as before; then proceed turning, as before described.

To turn in a balance staff in a Geneva lever watch, remove the cock, take the balance spring stud from the cock, as well as the collet from the old staff; remove the roller with brass pliers, to prevent any roughness, which might be caused otherwise; punch out the old staff in the riveting stake with a suitable punch. Select your new staff; for Swiss anchor movements all steel is generally used; measure the old staff from under the thick part, where the roller was before it was removed, over the top pivot; if broken, allow the length of the pivot, or rather more; take off cap jewels, and measure the entire length outside of the jewel holes, center the top pivot, and measure from the top pivot to the bottom for the entire length; cut off the bottom pivot to measure, and center it.

For the balance, measure under the thick part, as beforehand, to seat on the old staff, or from the bottom pivot to the balance seat. Mark the new staff to measure; place a screw ferrule on the thick part of new staff, place it in the lathe, and with bow and graver

turn down the part for the roller. When near the size, take a piece of soft steel filed crossways flat, and charge it with oilstone powder and oil. Work it as a file, using the bow. This is a sharp cutting process, and will soon take out the marks of graver and reduce the size of the staff. Clean off the oilstone powder, and try on the roller again and again, until very near the size, then when very clean use a bellmetal slip filed flat, charged with crocus or red stuff worked the same way. This process will bring a nice gloss, if the roller fits properly in its place. This part may be considered finished.

Remove roller, also screw ferrule, and place on the part finished a plain brass ferrule, pushed on tightly. This will not scratch. Turn the seat for balance and collet. After this, undercut the part near the top pivot, and turn down the pivots with the graver near to the size required, then with polisher or file finish them to fit the jewel holes free, and long enough to pass through the jewel holes to run well on the cap jewels. If conical pivots, the polisher or file must be of the proper shape, round at the ends. Take off ferrule, place the staff in the riveting tool, mount the balance, and with a punch rivet, while turning the balance. Poise the balance, place on the roller pin under one arm, mount the cap jewels, try in your staff, make any alteration necessary, place on spring collet, and try your watch.

Rubies.



ALL THE finest rubies in the world are, and for many generations have been, found in Burmah; and it has been the law in Burmah, no one knows for how long, that every ruby of more than a very small value is the personal property of the king. This law is supposed to have caused the destruction of many inestimable gems, as its natural result has been that persons discovering a ruby of above the regal value, have found themselves under an enormous temptation to reduce the stone to the permissible value—said to be about \$350, by breaking it into fragments of under a karat in weight.

Very few persons are aware of the great value and rarity of really fine rubies. From the beginning of civilization to the present hour the ruby has been, indeed, the type of concentrated preciousness: "Her price is above rubies." And from the beginning of civilization to the present hour the ruby seems to have steadily increased in value without suffering any of those fluctuations in price which have, from time to time, affected the diamond, emerald and sapphire, which, according to the opinion of Benvenuto Cellini, are the only other stones properly to be called precious. A ruby of six karats, free from speck or fracture, perfectly brilliant and of the right dark carmine color, would probably fetch \$5,000 per karat without difficulty; that is to say, about fifteen times the price of a fine diamond of the same weight. The writer of this article possesses two rubies, weighing together five and a half karats, for which he gave \$6,000, one a perfect stone of three karats, probably the only one that has been seen in the market for many years. It requires almost as much education of the eye to tell a good ruby as a good picture, and the extreme rarity of good samples renders it difficult to acquire the education. The unpractical eye would see little difference between a ruby worth \$1,000, and another of the same size and perhaps color not worth one hundred dollars; or between such a ruby as the former and a spinelle not worth five. Indeed, it is said that comparatively worthless spinelles have blazed for ages from regal brows with the fame of rubies, and have only been exposed for imposters by modern experts. No really fine ruby is ever shown for sale even in Bond street or Rue Castiglione, and but few are to be found in the secret drawers of the greatest jewelers. If you want such a stone you must mention it to Messrs. Garrard, or Hunt & Raskell, or Hancock, of London, and if it is

understood that you are prepared to pay a great price, those gentlemen will instruct their agents all over Europe, and perhaps Asia, and in the course of time they will be able to offer you a "specimen ruby," that is to say, a stone of the right color, and one which, to the naked eye, offers no spot or fracture or other defect, and which, therefore, is accounted "perfect;" though under a moderate magnifier, probably no really perfect ruby of three karats has ever been seen. It is known beforehand who are the persons who will purchase, and those persons, of course, see and buy the choicest stones before they can reach the market.—*Ex.*

Hard Soldering Gold.



THE HARD soldering of engagement or wedding rings, and other solid articles of gold, is best effected by the following alloys: For fine gold articles use 14 karat gold; for those of 14 karats, 8 karat gold may be used. Should the articles not be entirely solid, however, or have been soldered previously, an alloy of 2 parts of gold corresponding with the fineness of the article, and 1 part of silver solder may be used to advantage. The solder for solid wedding rings is best inserted between two ends, and well covered by thick borax water by which a nice adhesion is effected.

Colored gold rings, after having been soldered, are restored to their color by being boiled in dilute sulphuric acid. For this purpose they are thrown into a powder made of two parts saltpeter, one part alum and one part cooking salt, and then placed in a charcoal fire or laid on a clean charcoal and the flame of a lamp directed against them; then boiled in dilute sulphuric acid, dried and burnished with the steel. Should the color not be yellow enough, the operation may be repeated. A color produced by this recipe is far more durable than a common gilding, and, the powder once prepared, a great deal easier.

When preparing gold solders proceed as follows: When the gold and silver are melted add the copper with a little borax, and when the metals are in a good fusion, stir the whole well with a warmed glass rod to effect a thorough intermixture, and pour into the previously oiled and warmed form. When preparing any solder whatever, the metals most difficult of fusion should always be melted first, and the others be added corresponding to their degree of fusion. A close mixture also is necessary, especially when the metals possess a different specific weight. Fine gold should always be soldered with gold less fine, as also silver with less fine silver. A solder which is much liked by European goldsmiths, as it possesses, beside several other favorable properties, that of fusing very quickly, was composed as follows when analyzed: Silver, 54.74; gold, 11.94; copper, 28.17; zinc, 5.01. It is well for the production of this solder to first melt silver, gold and copper under cover, and only after the crucible has become somewhat cooled down, to add the zinc while constantly stirring the mass; even under these circumstances the zinc cannot be prevented from burning, wherefore take a little more.

Another recipe for a fine gold solder is made by taking 16 grains fine gold and 2 grains fine silver, melt them in a new crucible in a draught furnace, stir the mass well and throw in a little calcined borax of the size of two peas as soon as it flows clear. Then pour into the form, cut into thin sheets and dip it. By so small a quantity as the specified a crucible is not necessary; a charcoal may be simply hollowed out, and the metal can be melted by the blowpipe. Should the article to be soldered be very thin, to each part gold one-quarter fine silver may be added.

It is well to remember, however, that the solder, prepared by the above recipe, or any other gold solder containing zinc, cannot be used for coloring, as the latter will cause it to turn black.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of March 16, 1886.

337,908—Watch Chain Swivel. W. F. Whiting, Norwood, R. I.

Issue of March 23, 1886.

338,385—Watch. A. Benoit, Chaux-du-Fonds, Switzerland.

338,271—Watch Case. A. J. Hugle, Chicago, Ill.

338,503—Watch Case Stem. W. H. Fitzgerald, Brooklyn, N. Y.

338,500—Watch Case Stems, Making. W. H. Fitzgerald, Brooklyn, N. Y.

338,501—Watch Case Stems, Die for Making. W. H. Fitzgerald, Brooklyn.

338,502—Watch Case Stems, Die for Making. W. H. Fitzgerald, Brooklyn.

338,292—Watchman's Time Detector. L. W. Pennell, Braintree, Mass.

Issue of March 30, 1886.

338,935—Clock, Electric Alarm. G. H. Davis, Washington, D. C.

338,773—Clocks, Circuit Closer for Electric. C. H. Pond, Brooklyn, N. Y.

338,753—Watch Case Pendant. C. Kistler, Sterling, Ill.

338,947—Watch, Stem Winding and Setting. W. H. Fitzgerald, Brooklyn, N. Y.

338,946—Watch, Stem Winding and Setting. W. H. Fitzgerald and E. A. Marsh, Brooklyn, N. Y.

338,945—Watch, Stem Winding and Setting. W. H. Fitzgerald, Brooklyn, N. Y.

338,959—Watches, Combined Wheel and Pinion for. G. E. Hart, Waterbury, Conn.

338,960—Watches, Mainspring Barrel for. G. E. Hart, Waterbury, Conn.

Issue of April 6, 1886.

339,220—Clock, Night. C. H. Shaw, Assignor to J. P. Adams, Brooklyn, N. Y.

339,264—Clocks, Step by Step Mechanism for Electric. J. E. Carey, New York, N. Y., Assignor to the Electric Time Company.

339,377—Timepieces, Dial Train for. D. H. Church, Waltham, Mass.

339,378—Watches, Going Barrel for. D. H. Church, Waltham, Mass.

339,246—Watches, Stem Winding and Setting Mechanism for. H. Vent, Chicago, Ill.

[Reprinted from the Mineral Statistics of the United States for 1883-1884. Edited by Mr. Albert Williams, Jr. Published by the Geological Survey.]

Precious Stones.

BY GEORGE F. KUNZ.

Continued from page 74.

Chondrodite.—The finest known crystals of chondrodite, and the finest known gems of this mineral, have been found at the Tilly Foster mine, Brewster's, New York. The gems are few in number, and one of the finest is a cut stone* measuring one-half by one-quarter inch, of a transparent garnet color. Another,† an essonite-red crystal, is one-quarter by one-eighth inch, and another,‡ of a red

* Cabinet of F. A. Canfield.

† Cabinet of C. Bullman.

‡ Cabinet of F. A. Canfield.

essonite color, is one-quarter by one-quarter inch. The two latter, though uncut, would furnish fine gems. The finest of these crystals are in the Allen cabinet, now at the Johns Hopkins University, and in the mineralogical cabinet of the Peabody museum. The gems are so few as only to serve for mineralogical rarities.

Turquoise.—Mr. Bernard Moses recently brought to New York a series of finely colored specimens of the American varieties of turquoise, obtained at Mineral Park, Mohave county, Arizona. They were from three veins, varying in width from 1 to 4 inches, about 100 yards apart, running almost parallel and traceable for nearly half a mile. They show evidences of having been worked by the Indians and Spaniards, and a large number of stone hammers were found.

Some of the largest masses of the American turquoise are 3 inches in length and 2 inches in width, but are poor in color.

No work is carried on at present at the Los Cerillos mines, the recent investment to work that locality having proved unsuccessful. Some of the specimens sent east showed a fine blue color, which, however, was artificial, as proved by dipping for a moment in ammonia. This artificial coloring is attributed to the Indians, but no such pieces have come to my notice that showed evidence of Indian working. Along the line of the railroad turquoise is sold to some extent by the Indians of the San Domingo-pueblo, New Mexico, the men, women and children coming some distance from the road to sell

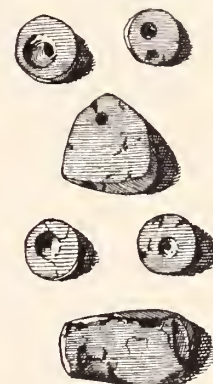


FIG. 1.—Turquoise Beads and Ornaments made by the Indians of the San Domingo-pueblo, New Mexico.

it. They are ground into round or heart-shaped ornaments, which are drilled with a crude form of bow-drill called by them "malakates." The drilling point is made of either quartz or agate, and the wheel to give it velocity was in one instance made of the bottom of a cup. The Indians often carry the cut turquoise pieces

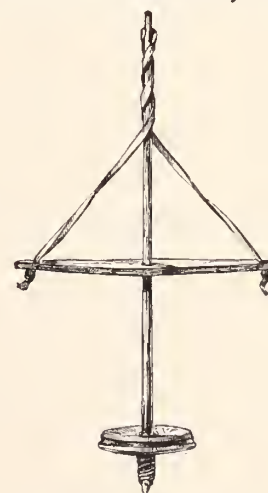


FIG. 2.—Bottom of Porcelain Cup, Point of Agate.

in their mouths for days until an opportunity to sell them presents itself. The selling price of the ornaments is now very low. Rev. R. T. Cross states that one string made up of many hundreds of stones was valued at the price of a pony. Turquoise was used by the ancient Mexicans to inlay obsidian ornaments, and also together with pyrite for making mosaic inlays and incrustations, thus forming many rich and curious effects.

Hoffmann§ mentions turquoise from the mountains 5 miles north of Columbus, Nevada. The specimens are of a pale blue color, and some fine ones have been obtained, although a number of stones that have been offered for sale were artificially colored.

Very little of the American turquoise seems to find sale except as tourists' souvenirs or mineralogical gems; yet for ornamental or inlaying work it might have quite a sale, were it properly introduced, as the green color would contrast favorably with many stones or wood.

Hematite.—See 1882 report.

Ilvaite.—Mr. R. D. Rand|| observed some small black crystals of ilvaite in a narrow calcite vein in gneiss at Flat Rock tunnel on the Philadelphia and Reading railroad, opposite Manayunk.

This mineral forms a curious deep black gem and is one of the few that can be used to represent the initial "I" in jewelry work made up of the initial letters of gems. It would also represent the letter "Y," although the name yenite has been rejected.

It is reported as occurring with hornblende and magnetite, traversing quartz, in slender brown-black or black crystals at Cumberland, Rhode Island, and formerly also at Milk Row quarry, Somerville, Massachusetts. No material of this species for really fair gems has as yet been found in the United States.

Pyrite.—The small groups of brilliant pyrite occurring with the shale found through the coal regions, are trimmed and cut into ovals, squares, and other shapes, and sold for mounting as scarf pins, lace pins, ear rings, and ring stones, as well as other ornaments. Fine single crystals are also sold for ornaments, principally at Mauch Chunk and the summit of the Switchback road, and by the local jewelers at Ashland, Shenandoah, and Mahoney City. The finest specimens used here are from the Raven Run mine, 6 miles from Mahoney City.

Many fine single crystals with a very high polish have been found at Black Hawk and other localities in Colorado, which are often sold for ornaments, just as they are found, at Denver, Colorado Springs, and other places in the West. These are compact enough to cut into the faceted gem, known in Europe as "marcasite," which has been almost entirely superseded by bright steel jewelry.

Diopside.—Associated with the garnets from Fort Defiance (Arizona), Gallup (New Mexico), and other localities in that vicinity, small pieces of almost emerald-green diopside are found—evidently a chromium diopside similar to that found with the South African diamonds, the peridots in that locality being also mistaken for emeralds during the diamond excitement. As a rule they are too small to afford gems of any value, but a few pieces have been found that are of sufficient size for very small gems. This would be a very desirable addition to the list of American gem localities, if the specimens were found in any size or quantity.

At the De Kalb (New York) locality, some very large crystals were found in 1884, several over 3 inches long and 1 inch thick, with clear spots of gem material, promising to afford cut stones weighing 20 to 30 karats.

FELDSPAR GROUP.

The greenish variety of orthoclase, called lennilite by Dr. Isaac Lea,¶ found at Lenni Mills, Delaware county, Pennsylvania; the nearly variety called delawarite by Dr. Lea, and the bluish-green subtransparent of an aventurine character, the bright particles being hexagonal hematite (?), called cassinite by Dr. Lea, found at Blue hill, 2 miles north of Media, are all at times of fine enough color to make a common gem or ornamental stone.

Large bowlders of labradorite are often met with in the towns of Lewis, Moriah, McIntyre, Newcomb, and Westport, also in Green, Lewis, Orange, Schoharie, Saint Lawrence, and Warren counties, New York. Within a few miles of Amity, in Orange county, Mr. Silas C. Young broke up a mass of fine material for specimens,

weighing over two tons, that showed the chatoyant play of colors very well.

In Pennsylvania it occurs in bowlders at Mineral hill, Chester county, and opposite New Hope, Bucks county; and also in the Wichita mountains, Arkansas.

Mention is made by Genth and Kerr* of a curious white variety occurring at the Cullakenee mine, Clay county, North Carolina, and also large crystals in the trap at Shiloh Church. On the road to Charlotte, Mecklenburg county, and near Bakerville, on Toe river specimens showing a slight blue chatoyancy are also found.

Rockport, Massachusetts, formerly afforded many finely colored pieces of amazonstone. Some fine green crystals have also been found at Paris, Maine, and at Mount Desert material that will cut into fair gems is occasionally met with.

One large, fine light green crystal, over 6 inches long, was found near Amelia Court House, Virginia, at the microlite locality.

On the John Smith farm, Middletown, Delaware county, Pennsylvania, many shades of green feldspar, passing into the cassinite and delawarite, are found in the soil in loose bowlders up to 20 inches in diameter.

Elæolite.—The elæolite of Gardiner and Litchfield, Maine, would admit of a very good polish, and at times the color is greenish and if polished would look quite well. Some of the Salem, Massachusetts, variety would also do for this purpose.

Leopardite.—A compact orthoclase rock, which is spotted with hydrated sesquioxide of manganese, called leopardite,† is abundantly found near Charlotte, Mecklenburg county, and also in Gaston county, North Carolina. It is a variety of porphyry with crystals of disseminated quartz. This material is found in large masses and would furnish a good ornamental stone if polished. It would also furnish material for a cheap gem stone.

Moonstone.—At Van Arsdale's quarry‡ near Feisterville, Bucks county, Pennsylvania, orthoclase is found in crystals from one-half to 2 inches in length, usually, however, in cleavage masses of gray or grayish-black colors, which show the blue chatoyancy, as well as many varieties of labrador spar, and make a very fine variety of moonstone.

The albite occurring in such beautiful specimens at Mineral hill, near Media, in Middletown, Delaware county, Pennsylvania, shows the blue chatoyancy remarkably well, and is there called "moonstone." It might well be, and is doubtless rightly classed under this head, since the appearance differs so slightly from an orthoclase moonstone, and it is the effect that really gives it its name.

The greenish-gray granular albite or oligoclase found in the serpentine at the magnesia quarries, West Nottingham township, Chester county, Pennsylvania, shows a faint blue moonstone luster.

The beautiful feldspar found by Mr. W. W. Jefferis, with the sunstone at Pearce's paper mill, shows the blue chatoyancy as well as any labrador spar. It may be the latter or oligoclase (?). The finest examples of this mineral from an American locality, very closely resembling the Ceylon in quality, transparency, and color, have been lately found at Amelia Court House, Virginia, by Mr. George W. Fiss, of Philadelphia, who obtained two very fine gems over one-fourth of an inch across.

Peristerite has been found in some abundance in the town of McComb, Saint Lawrence county, New York, associated with common orthoclase; it occurs by the ton, and many of the specimens show the beautiful light blue chatoyant effect. Mr. C. D. Nimms has also observed this mineral as far north as Bathurst near Perth, Canada; also in the towns of Pierrepont, Russell, and in at least a dozen other places in this section of New York State. Some specimens make a very fine gem stone, differing somewhat from labradorite and moonstone. Mr. Charles A. Dana, of New

* "Minerals and Mineral Localities of North Carolina," page 48.

† "Minerals and Mineral Localities of North Carolina," Genth and Kerr, page 51.

‡ "Preliminary report on the Mineralogy of Pennsylvania," page 89.

§ "Mineralogy of Nevada."

|| "Preliminary report on the Mineralogy of Pennsylvania," page 22.

¶ "Proceedings Philadelphia Academy of Sciences," May, 1866.

York, has had a number of these flesh-colored pebbles of orthoclase found on Long Island sound, near his home, at Glen Cove, New York, cut *en cabachon*, making thus a very effective salmon-colored stone.

Perthite, found near Perth, Ontario, Canada, is likely to be found in the United States as bowlders, and possibly *in situ*. This forms a very curious and rich-colored gem stone, with its bright aventurine reflections.

A very fine oligoclase occurs at Dixon's quarry, Newcastle county, and a fine striated variety at West Chester, Delaware county, Pennsylvania.

Sunstone.—Very good sunstone (oligoclase?), with very fine reflections, has been found near Fairville, Pennsbury township, Pennsylvania. Sunstone (oligoclase?) occurs at Mendenhall's lime quarries, Pennsbury, Chester county; also in Ashton township, some of which is of a grayish-white color with coppery reflections; and also a curious variety of sunstone in moonstone (albite) is found, showing double reflections.

A very fine green and red sunstone is found near Media. On John Scofield's farm, in Middletown township, Delaware county, moonstone and sunstone in small nodular lumps are scattered through the soil. About 1 ton has been taken out since the locality was discovered. On John Hibberd's farm, in the same township, moonstone in bowlders is found. A very fine sunstone, the orthoclase of which is of a very rich salmon color and quite transparent and streaked with white, showing the aventurine effect beautifully, is found at Glen Riddle, Delaware county.

Another beautiful variety is found in the hornblende at Kennett township, Chester county; this, Dr. Genth thinks, is most probably an oligoclase. The greenish orthoclase, sometimes in bright green pieces, also pale green, and at times much spotted with brownish tints, all showing a very good sunstone effect, is found at Mineral hill, Middletown, and in Upper Providence, Delaware county. The orthoclase of Frankford, Pennsylvania, with the göthite disseminated through it, approaches the sunstone in appearance very closely.

On the Horace Greeley farm, at Chappaqua, § New York, small pieces of an orthoclase sunstone were found, almost as fine as any of the Norwegian.

Obsidian.—Smoky, transparent obsidian that would cut well, and form a curious variety somewhat resembling the "Moravian bottle glass" (moldavite), but not so green, has been found in rounded pebbles, over 1 inch across, near Santa Fé, New Mexico.

A porphyritic and spherulitic obsidian is found under the trachyte on Gunnison river, and a heavy vein of porphyritic obsidian near the Rio Grande pyramid, continuing from there southward through the trachytic bed. Nodules occur in the lower members of the trachytic veins.

A dike of obsidian, light gray and clear with concentric structure, sets from the Colorado Central lode near Georgetown, north of Saguache creek. Hoffmann mentions obsidian in fine pieces and very abundant as occurring 10 miles southeast of Silver Peak, Nevada. Across the State line, 5 miles in Owen valley, California, it is found in red fragments, and also banded with alternate layers of black and brown. Obsidian occurs in large, fine black pieces, and mottled black and brown, and in small layers, in a moss rock at Obsidian cliffs, Yellowstone park.

Octahedrite—Octahedrite or onotose is reported as occurring in small crystals at Dexter's lime rock at Smithfield, Rhode Island, and in flat tabular glassy crystals of a pale green color and very brilliant in the gold sands of the Brindletown mine, || Burke county, North Carolina. These would possibly afford small gems, nothing, however, to compare with the beautiful blue crystals from Brazil, so splendid at times as to be mistaken for diamonds.

Brookite, arkansite, microlite.—At the Ellenville, Ulster county, New York, lead mines some remarkable flat, ruby-red crystals of

brookite have been found, and at Magnet cove, Arkansas, remarkably brilliant crystals of the variety of this mineral known as arkansite occur in great profusion, at times of a transparent honey yellow. The mineral does not, however, readily admit of polish. One fine crystal of microlite in the cabinet of Mr. C. S. Bement, is about three-eighths of an inch long, and in part of a rich honey-yellow color, having all the color of topazolite, with a higher luster. This might possibly be added to the list of American gem minerals. This crystal was found at Amelia Court House, Virginia. Some few of the microlites found at that locality are of sufficient transparency to afford gems, the color ranging from an essonite red to a rich spinel yellow and being remarkably brilliant. A fine gem was described by Mr. W. E. Hiden. ¶ This is now in the collection of Mr. Clarence S. Bement.

Microlite has the highest specific gravity of any known gem, being about 6.

Ilmenite.—At Magnet cove, Arkansas, the ilmenite is found in such fine bright crystals as to form natural ornaments, and will, besides, admit of a fine brilliant polish.

(To be Continued.)

Gossip of the Month.

A MEETING was recently held at the British Horological Institute, London, to inquire into the causes of the present depression in the English watch trade. A long discussion brought out divergent opinions as to the cause, the most general being that foreign-made watches were allowed to be stamped with the English Hall mark, and thus be sold for English-made watches. It was also asserted that even the names of many of the best English makers were afterwards forged upon them. Sir John Bennett said that for forty years he had seen the present depression, if not extinction, of the English trade, unless British watchmakers adopted the method of their Swiss rivals, which was to make the best possible watch at the lowest possible price. He urged that Switzerland had a better system of primary schools for special technical education. Other speakers pointed out that in Switzerland the manufacturers had the advantage of longer hours of labor, amounting in some cases to 30 per cent. in the cost of production, and so long as Swiss watches could be palmed off as English-made it was impossible to compete. A resolution was passed asking Parliament to legislate to prohibit the Goldsmith Company and the Assay Office from stamping foreign-made watches other than as such.

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A PARISIAN paper recently gave an interesting account of the new California, as the gold mines discovered in the valley of the Djol-gute river are called. This valley is upon the Chinese bank of the Amoor, directly opposite the Russian colony of Ignachino. Gold was first discovered in May, 1884, and soon attracted many adventurers, most of them being Russian deserters, escaped convicts from Siberia. The number of these in January was 9,000, which has since been very materially increased; also about 6,000 Chinese and 150 of other nationalities. The gold finders are divided into 722 small groups of workmen, who are absolutely equal. These elect 12 elders, who do not work themselves but receive about \$150 a month salary and superintend the diggings. The colony does not meet with any interference from the Chinese authorities, the laws of which are very simple and severe, the penalty of death being inflicted for cheating at play, for adulteration of gold dust, or for theft, while flogging is inflicted for drunkenness during hours of labor or for bringing women into the colony. The gold fields are 25 miles in length and three broad, and are said to be very rich, seven pounds of gold

¶ *American Journal of Science*, July, 1885.

§ "Proceedings New York Academy of Sciences," Vol. I.

|| "Minerals and Mineral Localities of North Carolina," 1881, page 84.

being taken from 32 cwt. of gravel, even with the primitive methods of washing it at present in use there.

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REFERRING to those Angels of Commerce, commercial travelers, that uncouth and illiterate evangelist, Sam Jones, who has been holding forth in Chicago for some weeks, says that if it is essential for a "drummer" to drink and gamble and use tobacco, he'd rather be a third-rate dog than a first-class "drummer." Sam ought to know that these qualifications are by no means essential to the success of a good salesman, whether he be a traveler or located in the store at home. As a matter of fact, the life of a traveler is such an arduous one that dissipation would soon use him up, a fact they are not slow to learn. Of course, there are some hard cases among the commercial travelers—so there are among clergymen better educated than Sam Jones—but as a class they will compare favorably with any other class of business men in point of morals. They are generally good natured, social fellows, who like to joke and have fun, are well posted on the news of the day, are good judges of human nature, and have a habit, born of long knocking about, of making themselves at home wherever they are. They adapt themselves to circumstances and to the company they are in with wonderful facility, and are, in fact, men of the world in all essential particulars. But with all their jollity and frivolity, they are also good citizens at home, most of them having wives and little ones whom they love and cherish with all the fondness of the most sedate stay-at-home that ever said a prayer or sang a psalm. If evidence is wanted as to their habits or their moral character, consult the hotels of the country where they make their homes most of their time, and see if any class of travelers stands higher among landlords who are most jealous of the reputations of their houses. Commercial travelers have to answer for many sins that do not belong to them; if a smart newspaper paragrapher has a shady story for which he wants a hero, forthwith he conjures up a "drummer," and makes him responsible for it; or if a sensational Evangelist wants to point a moral the convenient and ubiquitous "drummer" is made to do duty for the occasion, and being impersonal, he cannot resent it. Sam Jones may prefer to be a dog than a "drummer" under certain conditions, but we are of the opinion that any self-respecting commercial traveler had rather be an humble worker in the best interests of trade and commerce than Sam Jones under any conditions. We have the utmost respect for religion and all its honest professors of whatever degree, but no toleration for sensational mountebanks and charlatans in the church or out of it.

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WE PRINT in another column a communication from Mr. Nathaniel Jay Rice, relative to the work that is being done by the Protective Travelers' Association of the United States, in the interests of merchants. He thinks there is a good prospect for the passage of the bill that has been introduced in Congress providing that merchants may sell their goods in any State or Territory by sample, catalogue, price list or otherwise without payment of any license or mercantile tax whatever. This is to do away with what is known as the "drummer" tax that is enforced in a number of States. We have heretofore expressed the opinion that such legislation—in the face of several decisions of the United States Supreme Court to the effect that all such laws are unconstitutional—is entirely superfluous. However, the passage of the law referred to can do no harm and may serve to deter officers from attempting to collect the tax, when the court decisions are unknown to them. The Travelers' Association has much other important work on its hands in its endeavor to secure for commercial travelers various concessions from the rail-

roads as to rates of fare, stop-over privileges, amount of baggage to be carried, etc., and better accommodations and rates at hotels. It is but a short time since that several of the western railroads combined and refused to carry the sample trunk of any traveler except as through baggage, so that if the traveler wanted to stop off anywhere he had to send his trunks by express at greatly increased expense. If the Association can secure from the railroad lines uniform rates of passage and some special accommodation for the trunks of commercial travelers, it will accomplish a revolution in these respects. It has already laid the ground work for doing this, and has received from several roads intimations that they would make any reasonable concessions that would be uniformly adopted, and continued agitation will eventually secure the object sought. Mr. Rice makes an appeal to all merchants to become members of the Association, and thus give their moral support to the work that is being done in their behalf.

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THE proposition to constitute eight hours as a working day is by no means a new idea, but attention has been specially directed to it of late because of the announcement that it is one of the points for which the Knights of Labor are striving. They desire a reduction of the hours of labor, as they assert, in order that a greater number of men may find employment. This is certainly very laudable, provided they do not exact ten hours' pay for eight hours' work. The increased facilities for production that have come from improved machinery, and its general application to all kinds of industry, has caused our manufacturing capacity to largely exceed the demand, and the consequence is that the markets are overstocked most of the time. Capital being thus tied up, producers are driven to all sorts of expedients to convert their goods into money, and an unhealthy competition, in which prices are cut and bad practices introduced, is the natural result. If the shortening of the hours of labor will have a tendency to decrease production, it would be a gain to business men in general as well as to the working men. For the same reason the Saturday half holiday is a thing to be encouraged. If the production of goods in the jewelry trade could be reduced from one-third to one-half there is no doubt but it would be a decided benefit to all concerned. But who is there who is willing to forego his opportunities, when he thinks the demand will warrant liberal production? We fear there is no one so self-sacrificing—on the contrary, the ambition of every manufacturer seems to be to make as many goods as possible, and trust to luck to dispose of them to advantage. Each one seems to think he has a chattel mortgage on the market, and if any one is to get left it must be some other fellow. Short hours for labor are more popular in England than in this country, the average working day there being nine hours, while here ten hours is the average. The agitation for short hours was begun in England in the interests of women and children employed in factories, and when it was found a benefit to them the men thought it would be equally advantageous for them, and so nine hours is generally recognized as a working day. Whether eight hours for a working day in this country would, from a moral standpoint, be to the advantage of the workmen, is open to question; a prominent Knight of Labor is reported as having recently said that he was opposed to it, for the reason that it would simply be giving the men two hours extra to loaf around bar-rooms. This is putting a low estimate on the morality of the workmen, but there is some truth in it. The strongest argument in favor of the movement is that it might have a tendency to reduce production, and that would benefit the community at large as well as the workingmen.

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A MANUFACTURER complained to us recently of the practice, now

so common, of sending out goods on sale, and stated that it had grown to be one of the greatest abuses that afflict the trade. He said that his house had thousands of dollars worth of goods out in this manner all the time, and they never knew what moment they might all be thrown back on their hands. He referred to a recent case where they had, in the course of a few weeks, sent to one dealer over three thousand dollars worth of goods, and he had sent them all back but thirty dollars worth. The manufacturer paid the express charges on each package as it went out, and when they were returned he had express charges to pay again. He had thus lain out of his goods for some weeks and been put to considerable expense solely to accommodate some one else. His experience was that not more than twenty-five per cent. of the goods sent out on sale were actually sold to the person ordering them, while the charges back and forth, and the injury the goods frequently received, rendered this practice anything but profitable. Yet he could not refuse to conform to a practice that has become almost universal, and if he did he would lose many customers. His inference was that many dealers rely upon the goods they thus get to make their stores attractive, ordering from one and another goods on sale and keeping them till their freshness is worn off and then returning them. Well, there is no excuse for such a practice, except the common one, "they all do it," but we are confident that if a dozen leading houses in the trade would combine to put an end to it they could do it in a week. It is unbusinesslike, unreasonable and unnecessary—if dealers were not tendered such privileges they would get along without them as well now as they used to, before excessive competition introduced this and many other bad practices. We never could regard as valid the excuse so frequently heard, "I have to do this because others do;" why not call in those others and let them manage your business for you in all its details? If you are going to surrender your independence, you may as well go the whole figure.

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A CORRESPONDENT asks us if there is any way by which he can get insured against robbery. He says he carries full insurance against fire, but as he regards the chances of being robbed far greater than of being burned out, he wants insurance against that form of disaster. There is no company that we know of, nor any organization whatever that will indemnify a person who is unfortunate enough to be robbed; it has always seemed to us that there was a good field for just that kind of business, but we suppose the reason why it has never been undertaken is that there is no way of estimating the hazards, and consequently no way of fixing rates that would be likely to compensate those whose capital was at risk. Thieves are likely to make a raid at any moment, and a single robbery might consume all the premiums such a company would take in a year, so that to insure against robbery, the insurer would have to charge such rates that very few could afford to pay them. Of late years the co-operative form of making provision for special risks has worked very satisfactorily, especially in protecting large factories and mills from fire. These mutual companies are conducted on the principle of dividing among many the losses of the few, and as every one is liable to be the victim of disaster, they are glad of an opportunity to share the losses of others with the understanding that when they have a loss the others will come to their relief. In mutual insurance, the policy is pursued of making every risk as nearly fire proof as possible, and by this means the losses by fire have been reduced to a minimum. After a mill owner has put his mill in a satisfactory condition, he is then admitted to membership in a mutual company, and pays in advance about such rates as the regular stock companies would charge; so much of the sum thus collected by the company to pay losses is used for that purpose, and at the end of the year, the remainder that was not used is returned to the

members in the way of dividends. These dividends have averaged over sixty per cent. for many years, the members thus obtaining their insurance at extremely low rates. If a mutual association of, say, five thousand members, could be organized on this mutual plan to furnish members indemnity for any losses sustained by robbery, the cost to each member would be but a trifle, while all would enjoy a degree of protection that they do not now have. If five thousand dealers would pay in advance ten dollars each into the treasury of such a company or association, a fund would be accumulated that would pay for all the robberies that occur in the trade in the course of a year, and probably leave a surplus to be returned *pro rata* to the members. It would not be a difficult matter to arrange the details of such an association so as to divide the burden equitably among the members, the amount to be paid by each to be proportioned to the amount of stock he carries. The expenses of management of such an association should be very small indeed, probably limited to the services of a secretary. It may be thought that unusual facilities for fraud would be presented in such a scheme, but the experience of the mill mutual fire insurance companies has shown that less dishonesty is attempted under their system than under the ordinary plan of insurance in stock companies. The plan is one well worth trying, and is the only one we can suggest whereby our correspondent and others can be indemnified against losses by robbery.

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A GENTLEMAN in the trade who has recently returned from an extended trip through the Rocky Mountain and Pacific Coast States, reports that trade was good in all sections and dealers were looking forward to an exceedingly prosperous season. He brought home so many orders for goods that his firm at once put more men at work in their factory, and increased their production very materially. His trip was completed just before the great railroad strikes in the West, and he is now fearful that the disturbances may seriously affect the prospects of business in the extreme Western States. The strikes had not extended so far at the latest accounts, but the uncertainty as to what may come at any moment unsettles all calculations.

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IN THE early part of April rain and snow storms were the order of the day, and nights too, for that matter, followed by terrible floods in the rivers. The South, as usual, suffered heaviest from floods, great damage being inflicted by the rivers breaking through their banks and inundating the country for miles on either side of their channels. Many persons were drowned, and great suffering ensued. Of course, all trade was at a standstill while the floods lasted, and the trade in the South will take time to ascertain the extent of the damage and to feel the business pulse of the people before ordering goods with any degree of liberality. But for this the South was in excellent condition to buy goods, and had given indication that it was prepared to be liberal with its orders. By the time our paper goes to press it is probable that the full extent of the flood disaster will be ascertained. Some of the travelers for New York houses had hard times and great delay in making their trips, being detained by railroad washouts, and other casualties resulting from there being such a superfluous amount of water running around loose.

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THE items printed in THE CIRCULAR each month under the head of "Fashions in Jewelry," receive an extended circulation, being copied freely by the press of the country, and generally incorporated

with their regular fashion articles. In this way they are doing much good to the trade, as a correspondent testifies in another column. We are sending out each month, about a week in advance of the issue of *THE CIRCULAR*, to many dealers, printed slips of these articles, and they furnish them to their local papers. In this way a dealer can keep his customers informed as to the latest styles in jewelry, and the gossip regarding it in the center of fashion. We will send these slips to any dealer who will send for them, and the more who send the better we shall be pleased. We employ a well known fashion writer to prepare these articles, and manufacturers and jobbers can testify that she is indefatigable in hunting up novelties, for she gives them no rest until she has seen all the new goods they have to offer. Every dealer can do something towards putting these newsy paragraphs before the public by seeing that his local paper is supplied with them. Our object is to give the trade every advantage that can come from keeping track of the fashions in jewelry, and they should aid by giving them to their patrons. Send for the advance slips and place them where they will do the most good.

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ANNOUNCEMENT is made that the Chicago Ophthalmic College will soon be opened in that city, under the care of several skilled opticians. The purpose is to furnish medical graduates an opportunity to take a thorough special course of study of diseases of the eye and ear. The College will be open also to oculists who desire further special instruction, and to persons who are in the business of selling optical goods. The time is not far distant when persons who pretend to fit glasses to all kinds of eyes will have to have a certificate showing their qualifications to undertake such delicate work, such certificate to be issued by proper authority, as medical diplomas and druggists' certificates are now issued by State boards, after the subject has passed a satisfactory examination. The treatment of the eye is something that needs to be confined to competent persons quite as much as the treatment of any of the disease, to which humanity is subject, and no person who has not made a special study of optics should be permitted to adjust optical goods to remedy defective vision. More eyes are injured by the use of glasses not adapted to the peculiarities of the eyes under treatment than in any other way, and the necessity of such a college as is here proposed has long been felt. There is far less recklessness now than formerly in the adjustment of glasses, for dealers have generally availed themselves of such opportunities as were presented to perfect themselves in knowledge of the diseases of the eye, but the superior advantage offered by the Chicago College will be a boon to many. Such well known opticians as J. E. Harper, of Chicago, I. Glueck, scientific optician and writer on optical diseases, and J. B. Loring, a practicing surgeon in an eye and ear infirmary in Chicago, are announced as being connected with the new undertaking.

Hallucination of Hearing.

[BY DR. C. A. BUCKLIN, NEW YORK.]



IN OUR LAST number we considered some of the peculiar phenomena of hearing, which were readily explained upon clearly mechanical principles. We will now take up such phenomena as come under the general term of hallucinations. We could not help but muse over the simplicity of the explanations of the various peculiarities of hearing which were purely mechanical, but when we consider the hallucinations of hearing our minds are filled with wonder and astonishment, and we are left grasping in the air in vain attempts

to fathom the unfathomable or to comprehend what is mind. Where do mechanics stop and mind begin.

Without enlarging upon the fact that mind is a funny thing, we will proceed to illustrate some of its eccentricities.

Baillarger cites a case where a woman affected with religious monomania, perceived in her right ear the sound of celestial music which caused in her the highest of mental exaltation. She always heard the angels singing.

Clergymen in trying to illustrate that there is a hereafter, frequently quote the sentiments of dying persons of necessarily diseased mind and body as evidence that persons in this world have heard from those in a future state; while it is not the slightest evidence against the existence of a future condition, the ignorance of clergymen in general of the fact that these phenomena are hallucinations expose them to unjust ridicule. Being enthusiastic in the cause they seize upon these apparently striking demonstrations, and force them before the public in such a way as to impair their confidence in the general good judgment of their pastor.

Schroeder van der Kolk cites a case: A poor woman complained she was continually persecuted by the devil, who let loose all kinds of blasphemies in her ear, which was all the worse when she was actively trying to free herself from these hallucinations. She consulted a clergyman to have him dispossess her of the devil. She always heard him on the left side.

This woman, perhaps, was in no greater danger of eternal condemnation than the woman who heard the angels singing continually.

Dr. Hammond describes a case where a gentleman in good health contracted the delusion that the ticking of a clock consisted of articulate words. At first he only had this erroneous perception at night after he went to bed, but in a few weeks the ticking of a clock sounded to him like human speech. There was no uniformity of the language, but sometimes a single phrase would be repeated hundreds of times. As soon as he got beyond the sound of the clock the words were no longer heard.

Generally the expressions were in the form of commands. For example, if at dinner they would be, "Eat no soup," "Drink no wine;" or, "Eat your soup," "Drink some wine."

If the right ear was closed the delusion disappeared; but if the left ear was closed it continued. On neither side was there any reduction in the capacity for hearing. These expressions were not disagreeable to him; he would amuse himself by suggesting things for the clock to say.

Finally he placed clocks in all of his rooms, and if asked to decide any question he would give an evasive answer and saunter toward the ticking clock to hear what the clock would say. He would govern his actions accordingly, not, as he said, because they were real words, but because there was some spiritual influence that caused them to seem like words to him. What mediums such persons would make if, in addition to these peculiar delusions, they had the business tact to make use of them.

These peculiarities are not necessarily a species of insanity, as the following case illustrates:

A young man received a severe blow on the head above the left ear. A few months later while engaged in business, he saw a large black cat sitting on the floor immediately before him. He had no doubt as to the reality of the cat, but wondered where it could have come from. At last he moved toward where the cat was apparently sitting, and was surprised that the cat continued at the same distance from him as before. He then comprehended the nature of the defect and made many very intelligent observations regarding it. He only saw the cat when he had pain at the point of injury to his head. He saw it quite as well with his eyes closed as open.

The following case most beautifully illustrates the independent action of the visual centers:

A lady became the subject of persecution through anonymous letters which were sent to her in large numbers from various parts of the country. The outrage had gone on for several weeks before

there was any other result than intense annoyance. She finally began to worry in regard to the source of the abusive communications, endeavoring to represent to her mind the man or woman guilty of annoying her.

In this she was not successful. She could not determine whether the sender was a man or woman, much less bring before her mind's eye his or her image.

One day, however, as she lay in bed, with a sick headache, her mind reverted to the question that had so often disturbed her, Who was the person that sent her the anonymous letter? Happening to look in the direction of the large bay window that filled up nearly the whole front of the room, she saw a man and a woman standing in the opening. For a moment she doubted the reality of the appearances, but as she raised herself in bed to look at them better, she was astonished to perceive that they slowly faded out of sight. She got up, dressed herself, and did not see the images again for several days.

They at last made their appearance (this time while she was at the dinner table), and presenting the same appearance in every respect as they had at first. After that she saw them several times in the course of a month and then they disappeared never to return again.

The most curious circumstances about the hallucination was that the man was perceived with the right, and the woman with the left eye. Thus, if she closed the right eye, she saw only the woman, and if she shut the left, the man only was visible. If she had caused them to disappear by moving about actively, she could often bring them back by lying down with her head low.

With these peculiarities developed to a greater or less extent in many individuals, you must not wonder at strange individuals seeing and hearing strange things.

I am indebted to Dr. Hammond, of this city, for the cases illustrating hallucination.

child's shoe in brass, copper or silver. This was finished with a lining of bright colored silk or satin that came up above the top of the shoe and gathered into a little bag. Silver pins in form of a lily, also gold ones simulating a bird's nest, with pearls in it for eggs, were in request, and, when added to the usual contents of a bon-bon box, rendered the gift doubly expensive and correspondingly attractive.

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PRAYER books and hymnals with silver covers, on one side of which was etched in copy of some old picture, a story in the history of Christ, while on the other appeared waving palms or a lily, afforded elegant and appropriate Easter offerings. In this connection it may be well to mention the fact that in consequence of the popularity gained with a Protestant trade with silver trimmed and silver covered prayer books and hymnals, Catholic church books have this season been imported and provided, on this side, with the same class of elegant bindings.

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THE mention of these church books suggests a notice of the silver trimmed leather goods for which there is a big demand. These goods include pocket books, card cases, letter books, folios and purses for both sexes, also bill books, betting books, and cigar and cigarette cases for gentlemen. In the manufacture of these goods the best of leathers are used, including crocodile in various colors and shades, seal, alligator, English morocco and pigskin. These durable leathers, it is needless to add, are made up in the best possible manner, and decorated with sterling silver rims, corners and clasps, embossed or etched with appropriate designs.

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Flashions in Jewelry.

A Lady's Rambles Among the Jewelers.

THE depression always more or less apparent in every class of business during the penitential season of Lent, cast its shadows somewhat over the retail trade among jewelers and silversmiths. But with the joyous Easter-tide came a return of activity, which, to say the least, means better sales than last year at this time, with every promise of decided improvement for the fall trade.

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THE demand for Easter novelties, being of short duration, does not offer sufficient inducement to jewelers and silversmiths to justify large lines of goods in this direction. As usual, however, during the last days of the Lenten season recently past, was exhibited in show windows and cases, the usual array of bon-bon boxes in form of silver eggs, which, on being opened in half, disclose a dainty hiding place for the toothsome sweetmeats that play such an important part in Easter festivities. These great silver eggs were exhibited, in some instances, piled one above the other in wicker baskets of silver. In a few cases the eggs were of gold, and then again there were gilt eggs. These pretty trifles were, many of them, etched with appropriate designs or engraved with some scriptural text. The little comfit boxes proved popular during the Easter season, making, as these did, very acceptable as well as appropriate Easter gifts.

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A NOVELTY in Easter bon-bon boxes was introduced in form of a

DECIDED novelties in the silver trimmed leather goods are long narrow pocket books with heavy silver corners and rims. The advantages gained by this new form of purse is, first, that it is easily grasped and carried by the smallest hand, hence not clumsy like the old square shapes. Second, its long inside compartments admit of bills being arranged so as to lie in flat folds, not in bulging rolls. Another new article attracting deserved attention from gentlemen is the telescope cigar case, with space for twenty cigars. Elegant presents for sporting men are afforded in betting books with silver covers engraved in sporting subjects.

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THE beautiful finish, first introduced in gold jewelry, of a surface covered with different golds driven together, now appears on silver ornaments as well. Indeed, the effect is the same whether the base be gold or silver. A lace pin, seen last week, in which this finish proved very effective, simulated a fish, not only in form, but its peculiar shining colors. From the mouth of the fish hung a fine pearl. Sometimes platina and different golds are driven together in one trinket, when the former affords a desirable shade. This finish must not be confounded in the reader's mind with the equally beautiful opalaise surface described at length last month. The one is produced by different golds driven together; the other, by an exceedingly fine mosaic or inlaid work of tiny bits of the precious metals. These two styles do not in the least conflict, the results gained being very different in appearance.

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IN THIS connection it may be of interest to know that the chains, brooches and cuff buttons described in the March number of THE CIRCULAR, and showing the triple decoration of platinum, and plain

finished gold and antique chasing, are meeting with approval everywhere. This triple association is especially pleasing in goods for gentlemen's wear. It must be said, too, that the Queen chains are equally attractive with their combined twists and links of gold and platinum.

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THERE is excellent authority for announcing that fine Limoge enameled jewelry will be introduced to the New York trade this fall in new and artistic designs. This enamel painting, THE CIRCULAR is assured, will represent the highest perfection in this direction yet achieved outside of Limoges. The patterns will be quite new and will embrace brooches, bar pins, bracelets and other forms of jewelry. For some time past there has been a decided increase in the demand for fine Limoge enamels. By the by, THE CIRCULAR, as usual, was the first to announce that this beautiful decoration was coming into fashion. This announcement, made nearly a twelve-month ago, it may also be added, was discredited by some of the doubting Thomases.

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THE tenacity with which some of the good patterns cling to favor is remarkable. An instance is the old lace pin simulating a hop pole entwined by a vine with the matured hops hanging as pendants. This is a particularly graceful pattern, and very artistic in effect when the foliage and flowers are composed of different colored golds giving the natural green and yellow hues assumed by the mature plant. These pins are shown this spring again by some of our best houses.

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GREEN gold, by the way, is being employed to advantage on the insect scarf and ribbon pins. These insect pins, like many of the flower pins, are made to copy their models in coloring as well as in form.

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PENDANTS remain in favor and are out in new styles. Quite new are the wild rose pendants to wear on a slender gold chain. The flower, a single one, is of gold, beautifully modeled, tinted and set with little gems that act as anthers on the extremity of the tiny gold stamens, while the pistil of the flower is represented by a larger gem. An old idea in new dress, and introduced this season as a pendant, comes in form of a flat oblong gold locket of suitable size. These lockets are richly embossed and artistically set with colored gems. It has been a long time since the once popular locket has been in fashion, but there seems no reason to doubt their revival in the elegant form just described. There are also similarly decorated lockets of small size suited to wear as a charm on Queen chains.

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BEFORE dismissing the subject of lockets for pendants, it may be well to state that lockets have been of late much affected by school girls and misses, who find these trinkets not only convenient as mere personal adornment, but admirable receptacles for a little pressed flower or tress of hair; in a word, useful things to have about during the sentimental age when tresses of hair and faded flowers are treasured souvenirs between the youthful man and woman. The lockets made out of gold and silver coin, in which portions of the coin has

to be cut away to fit these with hinges and spring, will doubtless assume a new interest now the Secretary of the Treasury has enjoined their manufacture on the plea that it is a mutilation of the United States currency.

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THE terms bangle and bracelet appear to be confused in the minds of many people who use them. This confusion arises, doubtless, from the fact that there is not a clear understanding of the difference existing between these ornaments. A bangle, strictly speaking, is any ornament for the arm that forms a continuous circle without a click or fastening of any kind, and large enough to slip over the hand. A bracelet, on the contrary, is opened when adjusted to the arm which it closely clasps, or it may be flexible and self-adjusting, as in the case of the new "East Indian" bracelet. Both styles are in high favor and are worn in an infinite variety of patterns. As a rule, several bangles are worn on one arm at a time, linked together or loosely as the wearer prefers, while the fashion controlling bracelets has been to wear only one at a time.

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WITH the increased popularity of bracelets is, however, appearing the fashion of wearing bracelets in pairs, as a bracelet set with diamonds, and another exactly like it in form and fashion set with rubies or sapphires or other contrasting gems. The "East Indian" bracelet, described at length when it was first introduced in THE CIRCULAR, is having quite a run in this way. This bracelet, it will be remembered, is composed of little box-shaped sections strung together on a gold wire spring, and so arranged that it can be slipped over the hand with perfect ease and yet adjust itself closely to the arm when in place. This bracelet is not only elastic but reversible, presenting two distinct styles of finish and so affording two bracelets in one. This spring the "East Indian" is being set with fine gems of uniform size, shape and color. A pair seen and showing the same finish had in one bracelet four round fine sapphires set single in the center of a section, while the other had four diamonds of uniform size and brilliancy set in the same way. The effect, especially when seen together, is very rich and pleasing, and quite unlike any other bracelet in the market.

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ANOTHER attractive bracelet that has won high favor is the chain link bracelet, in which the links are graduated, being quite broad on top and narrow underneath the arm. These bracelets show a diversity of finish. There are embossed ones, set with small gems, which appear to be favorites among flexible bracelets. A stiff bracelet of pleasing appearance has an elongated flat knot on top, in embossed finish, the chasing extending around the arm. Very beautiful are the bracelets with a wild rose in tinted gold that shows jeweled stamens and petals. A decided novelty in bracelets is one in which the flat links that compose the ornament are apparently fastened together with little gold pins. Different colored golds in flower patterns are employed with good effect in the decoration of bracelets.

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AN ATTRACTIVE bangle just out consists of a circlet of twisted cord in red gold and may be worn in as many numbers as the wearer's taste dictates. It is so dainty in appearance that five or six can be worn on one arm without producing an over-dressed effect. The

bangles composed of several narrow bands of gold or silver, loosely linked together with a tiny chain, from which hangs pendant two or three sequins or coins, continues popular. Bracelets, with Oudjos attached as a charm, are already in favor, though this charm has been so recently introduced. Padlocks are also in fashion; indeed, the padlock bracelet is never out of style. Among old favorites that appear to have taken a new lease on life this spring is the "Mascotte." New ones seen recently presented the usual twisted gold coil, with the overlapping ends finished with finely carved balls.

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EAR rings are coming on apace, and there is certainly a growing disposition to wear ear rings in harmony with the brooch or pin. Occasionally one sees these cased or carded in sets, but as yet sets are the exception, not the rule, though it certainly looks as if, in the near future, this last sentence will have to be transposed. Several manufacturers, who do a large road business, are making ear rings in the popular bar and flower pin patterns, because they say these ear rings are being called for in sufficient numbers to justify their manufacture. The consequence is one sees this spring not only the little round gold or silver balls, but flower and insect ear rings, knot ear rings and other designs in small and unobtrusive effects.

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GOLD and silver hair pins, both plain and ornamental, continue in high favor, and consequently are out this spring in a great diversity of styles. There are hair pins showing double and triple links at the tops; hair pins simulating swords and daggers with jeweled hilts. Sometimes the top of the pin is richly embossed or it is twisted to simulate a cable. Sometimes it is finished with a jeweled flower on a tremulous stem, and yet again appears the ever popular crescent and star. These pins, even when quite plain in finish, are decidedly decorative in effect, and add greatly to the elegant appearance of a lady's *coiffure*.

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EVERY manufacturer who makes chains of any description has, it is needless to tell, a big stock of new "Queens." This convenient and popular chain is now demanded everywhere, and represents as great a favorite in the jeweler's case as is to-day produced. Queen chains and bracelets every woman wants, and there is no danger, at the present time, of getting too many styles of these popular articles. As regards the Queens there is little that is new to be said beyond the fact that, as THE CIRCULAR prophesied some time ago, many varieties in way of a pendant or charm for these chains have come into the market. Several of the leading retail houses are exhibiting decided novelties in this direction. There are not only Queen chains with pendants in floral patterns, such as a single jeweled rose, but an enameled vinaigrette, pendants in form of little gold wheels with jeweled hub and spokes, a true lover's knot studded with gems, a little gold fan in Japanese design, an old Roman coin, an antique padlock or a tiny gold safe with platinum bars and lock. These diversions in way of a terminating ornament to the Queen have by no means driven out of style the original ball and cube. There is ample room for all, especially as the balls and cubes are out in new styles of finish.

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FINGER rings are always in more or less demand, no matter what the fashion chances to be as regards other articles in jewelry. Every

married lady wears at least two rings, her engagement and her wedding ones, and young ladies and misses, as a rule, wear two or more at a time, while others, for a change, lie in their jewel boxes. In the setting of rings there appears to be no special changes this season. Where stones of two or more colors are used the object is to gain a pleasing and harmonious combination. Large stones and fine pearls are set high in small plain settings. Occasionally one sees a fine solitaire diamond set in a ring of twisted gold wire. The twisted gold wire rings are also set in turquoises for little girls and misses. Moonstones of the desirable blue tinge, cut intaglio, are set in rings for gentlemen's wear.

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PEARLS, when perfect, soon find buyers. To be perfect, these gems must not only be of a pure white color, with a luster peculiar to the gem, but of desirable shape, the preferred forms being perfectly round or a perfect pear shape. Fine colored pearls are also highly esteemed, and command fancy prices when of considerable size and desirable form. Black, lead color, gold and rose hued pearls all bring big prices.

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WHILE manufacturers, dealers and importers all agree that gold jewelry is more worn than for some years before, and that the demand is on the increase, they also affirm that the sale of silver jewelry remains unabated. There is but one conclusion to draw, and that is, that fine jewelry is fashionable now the world over, and so far as our own part of the world is concerned, the fashion is growing from Maine to Texas. With this increased demand, manufacturers have felt justified in putting on the market a better class of work in all respects than was practicable to hazard in dull depressed times. Forms are better and styles of ornamentation more elaborate and artistic. This holds true of the best grades of both gold and silver jewelry. Skilled workmen are in demand, and clever artists have all they can do to supply new and pleasing designs. Thanks to the fact that fashions are no longer set by one leader or one clique, wide license prevails, and women everywhere are enjoying this freedom from rule and restriction, by selecting what pleases them best and is least like their neighbors.

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THE service done to the jewelry trade by the very general adoption throughout the country last winter of *decolleté* dresses, which necessitated the lavish use of ornaments for neck and arms, is generally admitted by the trade. It is therefore a pleasure to announce that imported toilets for reception and evening wear, during the summer months at popular resorts, are of such character as to insure no diminution in the employment of jewelry of any kind. Indeed, the lookout promises no end of dog collars, beads and other necklaces, bracelets, bangles and hair ornaments.

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WHILE the new gowns for dress occasions show sleeves that expose the arms and therefore favor bracelets, the street and traveling costumes, on the other hand, are made with high necks and close coat sleeves which insure linen collars and cuffs, and therefore collar buttons and cuff buttons. Pendants attached to small gold chains promise to be much worn with the new summer dresses. Tourist's cloaks, raglins and jackets, in many cases, call for ornamental clasps, hence it is believed that handsome silver clasps will continue in vogue.

Silver clasps and buckles, set with Scotch pebbles in tiny sections and flush with the surface, will also be much worn with these garments. The Scotch pebble jewelry is also counted with popular ornaments for day wear.

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NUMBERED with patents recently seen and which promise good things, is a slide lock for the safety of jeweled lace pins. This slide lock is a permanent affair placed on the underside of the bar and near the outer edge. As soon as the pin has been adjusted in its catch it is locked in place with perfect ease by the wearer. The new attachment for the security of scarf pins, noticed briefly last month, is both simple and effective, and can be applied to small ribbon pins as well as the larger scarf pins. It can also be used on smooth pins as well as on pins with a thread, a convenience readily appreciated by everybody who has had experience with trying to force twisted pins through thick or stiff fabrics. The diamond pivot setting, new, yet old by this time to THE CIRCULAR'S readers, is now being employed in a variety of pendant settings, notably solitaire ear rings.

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NEW cane and umbrella handles show this spring silver deposit handles beautifully etched, which makes, of course, a style quite distinct from the silver deposit handles as originally introduced when they followed exactly the natural shape and markings of the buck-horn. One of the most artistic silver handles seen this season represents the head of a woman with luxuriant waving hair, that falls in twisted locks beneath the face to form a finish next the wood stick, and floats out from the top of the head in a loose long coil providing a convenient crutch for the hand to grasp without at all concealing the face.

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A WOMAN'S face and head with flowing hair is also employed with fine effect as a model for *repoussé* work and etching on the solid silver back of hand glasses and hair brushes. But there are things that must be seen to be appreciated. No pen and ink sketch can do justice to the graceful lines such designs present, and which furnish a pleasing change from the water effects that have proven so popular in the past in the ornamentation of silver.

ELSIE BEE.

held at the Alliance office on the 9th inst., attended by President Dodd, Vice-President Sloan, Treasurer Kimball, and Messrs. Alford, Bowden, White, Lewis, Parks and Secretary Champenois.

The following applicants were accepted as members:

M. Daniel, Baltimore, Md.; L. A. Piaget & Co., Paterson, N. J.; Gustave Rheinauer, N. Y. City, N. Y.; D. M. Tyler, Ipswich, Mass.; Jos. Wineburgh & Son, Utica, N. Y.; Wm. U. Watson, Buffalo, N.Y.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

POISING THE LEVER.

To the Editor of the Jewelers' Circular:

Will some of the many able writers on watchmaking give me some information on the importance of poising the lever and just what is meant by it. I find in repairing all kinds and grades of American watches that little or no attention is paid to poising the lever, and as it seems of great importance to me that it should be correctly poised in order to obtain correct rates in positions, I would like to hear the opinion of some one more competent to judge than myself, and also just what is meant by the term. Must it be so as to stand in all positions the same as we would poise a wheel or stand level like a scale beam. Hoping that I have made myself understood, I await the kindness of the members of the craft.

Yours truly,

FRANK H. FRENCH.

Hopedale, Mass., March 11, 1886.

[Replying to this inquiry we will say that in theory the "lever" or pallets and fork on their arbor should be poised or balanced, as that is what the word means. But in practice this is not found necessary, except, of course, within certain limits which good judgment will dictate. There is a point, however, to be watched, and that is the accuracy of the escapement, especially in two of its functions, that of "locking" and "draw." If the latter is correct and the fork nicely made, the guard pin will always clear the roller in all positions, and if the locking is light the labor of unlocking will be performed equally well in all positions, notwithstanding a little inequality of poise in the fork.—ED]

PLEASANT RECOGNITION.

A Missouri reader of THE CIRCULAR in a business letter says: "It is with sincere pleasure I herewith send you subscription price of THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW. And also hereby wish to attest that in my humble opinion it is the most valuable and instructive journal of its kind. I have been reading it for about twelve years now, and have become so much attached to it that when it is delayed for some reason or other, I miss it quite as much as I do my daily paper. Hoping it will long continue in its brilliant career."

An Ohio reader sends the following: "Enclosed find postal note for another year's subscription for THE JEWELERS' CIRCULAR. We have taken THE CIRCULAR for the last seven years and could not do without it now. I do not see how any practical jeweler could do without it."

And here is what a friend in the Lone Star State writes: "Here-with find \$2 for which send me THE JEWELERS' CIRCULAR for one year. Would like back numbers beginning with January, 1886, if you have them. For some time past I have noticed a void in my house, and couldn't tell what was the cause until I happened to think 'What has become of THE JEWELERS' CIRCULAR.' No jeweler

The Jewelers' Security Alliance.

President, DAVID C. DODD, JR.

First Vice-President, AUGUSTUS K. SLOAN.....Of Carter, Sloan & Co.
Second Vice-President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
Third Vice-President, DAVID UNTERMAYER.....Of Keller & Untermeyer.
Treasurer, W. C. KIMBALL.....Of H. F. Barrows & Co.
Secretary, C. C. CHAMPENOIS.....Of Champenois & Co.

EXECUTIVE COMMITTEE.

C. G. ALFORD, Chairman.....Of C. G. Alford & Co.
J. B. BOWDEN.....Of J. B. Bowden & Co.
GEO. W. PARKS.....With E. I. Franklin & Co.
J. T. SCOTT.....Of J. T. Scott & Co.
N. H. WHITE.....Of N. H. White.
CHAS. G. LEWIS.....Of Randel, Baremore & Billings.

EXAMINING FINANCE COMMITTEE.

JOS. STERN.....Of Stern & Stern.
CHAS. F. WOOD.....Of Chas. F. Wood.

Counsel, HON. ALGERNON S. SULLIVAN.

For further information, Application Blanks for Membership, By-Laws, etc., Address P. O. Box 3277. 170 Broadway, New York.

The regular monthly meeting of the Executive Committee was

should be without it; it is invaluable. This is our 35th year in business, and we must keep apace with the times, so send THE CIRCULAR."

A Canadian subscriber, remitting his subscription for another year, says: "I would not be without THE CIRCULAR while I am in the jewelry business, for I consider it a good guide for any intelligent man."

A gentleman sending his subscription from South Carolina says: "I have many solicitations to subscribe to other jewelers' papers, but I regard THE CIRCULAR as the best, and as long as it keeps up its standard I want no other."

A RETAIL DEALERS' ASSOCIATION NEEDED.

To the Editor of the Jewelers' Circular:

I have not regularly subscribed for THE CIRCULAR, but get it through the Western News Co. of Chicago. I do not know as I could really call myself a jeweler, etc., as I only served 4 years apprenticeship, but think I am able to handle most anything. I have read the letters in THE CIRCULAR, and especially those of the April number. I agree with them that it is necessary to have an organization of retail jewelers either for each State or for the whole, the same as the "K. of L." or "B. L. E." The place I am in is only small, but yet all dry goods stores carry jewelry, and our druggist carries a line of jewelry, watches, etc., which he buys from Chicago jobbers. I wrote them in regard to his business, and also returned them their catalogue, etc. He has also been reported to the Bradstreet Agency as being a druggist, but nevertheless he gets his goods at the same price I do mine, who have no other business than the jewelry. "W. E. W." thinks it is easy to run a man out, but, as in this case, when you strike a man that has 5 times more capital than you have, and a business that is all profit to live off of while you only have your one thing, and then you go to cutting, why where are you going to get your cash to hold out on and live? Perhaps he has never been in that fix, so he can afford to talk. Enclosed you will find an advertisement from a jobbing firm and you can see what he quotes goods at. They must either be bogus (which I doubt) or else he is running the retailer pretty hard. Perhaps the jobbers referred to are innocent of this, as it came with a circular from the Western Card Co., of Elgin. If they are they should take steps to correct the card company. I know that there were 50 or 100 of these advertisements sent to this place, as I saw them in the Post Office while being distributed. I hope you will speak to other retailers, and if anything can be done toward organizing an association let us be at it. I hope the perusal and investigation of this will not be obtruding on your time. I remain,

Respectfully yours, D. S. M.

Iowa, April 14.

BEAUTIFUL SPECIMEN OF TYPOGRAPHY.

To the Editor of the Jewelers' Circular:

A few weeks ago a man soliciting work to do at home left his card. I herewith send it to you, thinking it might interest you as a typographical curiosity.

John meiers
Watches French clocks,
and
Jewelry Repaired.
work done for the TRADE

New York, April 17.

MORE ABOUT CATALOGUES AND PRICE LISTS.

To the Editor of the Jewelers' Circular:

I have read with much interest the communications that have appeared in your columns regarding that worst of all abuses that we retail dealers suffer from, the promiscuous circulation of catalogues and price lists by jobbing houses. In this section of the country anybody who wants them can get them as readily as any dealer, and the consequence is that a large amount of orders that we should have are filled by express direct from the jobbing houses. A short time since a traveler for a jobbing firm called on me, and, of course, wanted to sell me goods, and among other things said he would sell to no one else in the place if I would give him a liberal order—he had probably called on the other dealers first. I asked him if he was not going to sell to some of his retail customers, and he got red hot, denied that he or his firm ever sold goods at retail or sent out catalogues. I happened to know of a dry goods man who had both a catalogue and a price list, and so I invited the young man to take a walk with me, and I soon run him into the dry goods store and at once asked the proprietor to show me his catalogue. He did so, and I also found out that the traveler had been there before he called on me and had sold a bill of goods. Then he tried to lie out of it by saying that this was the only instance, and the firm sold to this man because his wife was a relative of one of the partners. I could not see how that relationship could excuse them for trying to ruin my business, and so told the traveler that I should not want any more goods from his firm at any time or at any price. Just to test the question, I got my barber to write to the same firm for a catalogue and price list, and in due course of mail he had them both. I know of numerous instances where persons have come into my place and got my prices for certain goods, and have then sent to jobbing houses for them, getting them at the same price I would have to pay for them.

I would like to ask the trade if this kind of business is right. How do these catalogue-retail-jobbers think we are going to pay our bills if they rob us of the retail trade? They are mighty sharp in sending in their bills and pressing for payment, but do not seem to regard it as a matter of any importance that they have come between us and our customers, and so done all they could to put it out of our power to pay our indebtedness. Let one of us fail in our obligations and how quick he is put on the black list. For one, I am not going to submit to this imposition any longer without kicking vigorously; I will never buy another dollar's worth from any jobber who, to my knowledge, sends catalogues and price lists to outsiders, or who sells at retail at wholesale prices. Do these jobbers want the whole earth and the fullness thereof?

I maintain that there is no necessity for even the catalogues, to say nothing of the price lists, for no retail dealer is guided by them. They are visited frequently—sometimes too frequently—by the travelers of the different jobbers, and see samples of all the goods that are made, and one view of a well stocked sample case is worth more to a dealer than a whole car load of catalogues. All that I receive go to the rag man at once, together with the "pub. docs." sent me by our Member of Congress. I hate to see them around, for every time I look at one I am set to wondering how many of my neighbors in other lines of business have received the same thing. I do not want to insult any one or I would send back every one that is sent to me. I wish all retail dealers would unite in refusing to buy goods of any jobber who is known to send catalogues to outsiders, and let them understand the reason why they refuse to buy. Boycotting seems to be all the rage, and I think that we are fully justified in boycotting this catalogue nuisance.

H. J. M.
Battle Creek, Mich., April 15.

RESULTS OF DIVERSIFYING STOCK.

To the Editor of the Jewelers' Circular:

I used to see considerable in your magazine about diversifying stock as a means of getting even with the outsiders who are hand-

ling jewelry. Having something of a competitor who sells dry goods, fancy notions, glassware, etc., I followed your advice and put in a small stock of fine pottery, glassware and ornamental goods of this description. It attracted much attention, and the handsome vases and other showy goods conspicuously displayed soon brought me customers. They did not look out of place either, but helped to liven up my store and make it more attractive. Ladies came in to admire and inquire prices, and it was not long before they began to buy. You know how it is with a woman, when she sees a thing that she admires, the thought of it takes possession of her and she can't rest till she has secured it; so it was with those vases and things; they began to sell, and when Mrs. Smith bought one then Mrs. Jones had to have one, and so it went till my stock had to be replenished. All this time I was gaining customers for my jewelry stock, and, to cut the story short, I sold \$2,000 more goods last year than in any year since I have been in business, while my dry goods competitor has gone out of the jewelry, glassware, etc. I can confidently recommend this plan to others who are afflicted with outside competition; it does not require much capital to do it and I know that it pays.

B. L. W.

Wisconsin, April 16.

“NEW BLOOD” TALKS BACK.

To the Editor of the Jewelers' Circular:

My previous communication, wherein I said that, as a manufacturer whose business it was to turn his capital over at a small profit as often as possible, I would sell to any one who had the money to buy, be he a regular dealer, a dry goods merchant or a fancy bazaar man, stirred up the animals somewhat, as I see two communications in reply in the March CIRCULAR. Forgetting that abuse and making faces is not the kind of argument gentlemen indulge in, they fall to abusing me in a manner that would be amusing were it not so coarse. Without replying to their alleged wit, I will simply say that retail dealers themselves are entirely responsible for the fact that manufacturers sell direct to consumers or to those who come most in contact with consumers. I spoke of selling goods to Macy, and one of my critics takes me to task because, on a very large cash order, I sold at a lower figure than I had sold the same goods to the legitimate trade. I beg to say that any trade that pays cash is legitimate enough for me. But why shouldn't I make Macy a better price than I would the jewelry trade? He took my entire stock for cash, giving me a fair profit immediately; if I had refused to sell to him I would have been compelled to keep the goods on hand for months peddling them out by the dozen, half dozen or even twelfth of a dozen to the liberal buyers in the jewelry trade. My rent and other expenses meantime would have more than counterbalanced the discount I made to him. If the retail dealers hope to control the sales to consumers, they must wake up and fill the places they now rattle around in. The real merchants of the day are the men who keep what the public wants, sell at a low margin of profit and keep their capital moving. There are some manufacturers and jobbers, I know, who claim to be so immaculate that they will not sell to outsiders, yet their goods can be found in the bazaars as well as mine; the cash will take the goods every time, and that man would not be a true merchant who would refuse it so long as it came from an honest source. My goods are for sale; when they are made my profit and interest lie in getting rid of them just as soon as possible, and if the retail dealers will jump right in and buy them, they can have them on just as good terms as Macy can get them, provided they will pay cash and not offer me a four months' note and claim the privilege of renewing for four months more. I have not got capital enough to do business that way, and if I had I could employ it to better advantage. You can take it for granted that when a dealer complains of an outsider stealing away his trade, that man is not filling his place in the trade; if he was there would be no room for the outsider. It can be set down, as a rule, that retail dealers are not first-class business men or they would not, in these progressive days, be doing the

picayune business that the majority of them is contented with. The fact is, most of them are watch repairers, and would rather putter all day over a fifty cent job, with a glass screwed into one eye, than sell goods. The outsiders, on the contrary, make their living by selling goods, and they must sell a good many to make a profit. As a consequence, they buy liberally, and, having got their goods, use every legitimate means to sell them, advertising freely and resorting to every device to attract customers. I am by no means alone in the position I have taken, but I find many manufacturers who say privately that they are ready to sell to whoever will buy, and that if the time ever comes when they have to choose between the outside trade and the retail jewelers, they will stick to the outside trade, because sales are quicker and payments more prompt. I repeat what I said before, and what is a mere business proposition, that my profit lies in quick sales and prompt returns, and until retail dealers become as liberal buyers and as prompt pay as the outsiders, I shall continue to sell to outsiders. This may be heresy in the eyes of some slow going retail dealers who think they should be protected by the manufacturers, but if it is, it is a heresy that is gaining adherents rapidly.

NEW BLOOD.

New York, April 20.

NO INDEMNITY FOR ROBBERY.

To the Editor of the Jewelers' Circular:

A short time since some burglars broke into my store at night and packed about \$5,000 worth of goods with which they were about to depart when they were frightened away by a night watchman, who, by the way, did not suspect their presence. Had they got away with the goods I should have been ruined. It occurred to me that I ought to be insured against robbery as well as against fire, but I do not know where I can obtain such insurance. Can you inform me if there is any company that insures against burglars, sneak thieves and other robbers? If I should be burned out the insurance companies would make good my loss, but if I am robbed I have got to stand the loss myself and should be ruined.

B. R. C.

New Orleans, April 10.

[There is no company or other organization that we ever heard of that insures against robbery. The nearest approach to it is the Jewelers' Security Alliance, which, in case any of its members are robbed, assumes the work of hunting down the thieves and recovering the property if possible. Their main object, however, is to catch the thieves, and to this end employ the best detectives and spare no expense; but the prosecution of the thieves does not restore the goods to the person robbed. A certificate of membership in the Alliance, conspicuously displayed in your store, is one of the best preventives of robbery that can be employed, for the thieves have a wholesome dread of that organization and its vigorous methods of detection and prosecution.—ED.]

OUR FASHION WRITER GETS A COMPLIMENT.

To the Editor of the Jewelers' Circular:

I want to thank your fashion writer for her excellent monthly letters on fashions in jewelry. In response to your invitation I sent for the advance sheets of her items, and have been receiving them now regularly for nearly a year. As soon as they come I call in the local editor of our leading paper, and he is always glad to reprint some, if not all, of the paragraphs. That they are read and appreciated I know, for every little while a lady will come in and ask if I have such and such an article that she saw mentioned in the paper. I have sold a number of bills of quite respectable amounts that I know were the direct result of reprinting some of "Elsie Bee's" paragraphs in our home paper. We have here also a paper devoted to the household, a ladies' paper, and the editor of it comes to me every month for these fashion articles, so that I divide them out between him and the local of the daily paper. I am confident their publication is a most excellent thing for the retail trade, for our

western ladies are always afraid that if they buy jewelry of their local dealer they will get something that is old-fashioned, and these articles tell them what is fashionable and popular with the ladies in the East. As this is a new feature in THE CIRCULAR, I thought you might like to know what a retail dealer and an old subscriber thinks of it.

R. T. H.

Minneapolis, Minn., April 14.

WHY RINGS ARE DISCOLORED.

To the Editor of the Jewelers' Circular:

Will you in your next issue explain to us why a ring made of either 14-k. or 18-k. gold will blacken a person's finger. We have had many explanations given us, none of which seem to be satisfactory to our customers. We have in mind now one party to whom we sold a 14-k. seal ring that had been worn but a few days when the finger on which the ring was worn, also the finger next to it, were all blackened. Now, there can be no question but that the gold is fine 14-k.; it has been tested and proven to our satisfaction. The party wearing this ring is a bookkeeper, and his hands do not come in contact with acids of any kind. If you will kindly give us a reason for this you will greatly oblige us. We are subscribers to THE CIRCULAR, and noticed you had many communications on different subjects, which led us to think that perhaps you would devote enough time and space to answering our inquiry.

R. P. T.

Albany, N. Y., April 14.

[Every person has a certain amount of minerals in his composition, but some have an excess, which is cast off with the perspiration, and will discolor the finest gold. Many persons have a large amount of sulphur in their system, and others have other substances, frequently given as medicine; the perspiration of such persons is tainted with these substances, and it not only discolors gold, but such of their clothing as comes in contact with the body. We have known persons who could not carry a bunch of keys in their pocket a week without their being rusted. The bookkeeper referred to undoubtedly has a surplus of sulphur.—Ed.]

SAW MILL CORNERS. HOP-BOLE CO., WIS., April 10en, 1886.

Mr. Editor of Schulers Zerkeler:

Its a long dime between drinks as the Guverner sed from Nord Karolina to the Guverner from that under Staid. Dat godashen I must yuse for my exkuse dat you have not herd frum me sunner. But wenn you aboindet me for your correspondent lasht November, and my leddre god before cridical public, some schmart feller dold me, befur I write agen do a noosebaber, I shud lern furd how do schbell, denn he shoed me 2 words dat het a mistake in it. Well I dinks do miselfe dat must nod hebben agin & so I wend do a sephellin schkoole dis winder und lerned how do ride & schbell und I hobe wen dis leddre abbears befure de public, he will be subrised add de brogress I med.

De schkule wud heve bin all ride only we hed a lod of nise gurls in de klass, & uf coarse I god so well agwained wid all uf dem dat de deecher hed do ask me dwise sumedime befur I heerd de wurd dat he wanded schbell. Nou comes de dragic bard uf mi yung schkool deys in my old atch. 1 eveneng dey, I meen de gurls, (dey was vull uf plai & misshief), asg me do goe goasding wid dem, and I sed hoo is goeing do be de goasd? & dey laafed. I dohd id was goeng do shblit der sites or bust somedings uf der gorset schdrings, bud dey gut ober dis all ride & sed do me dey dond meen playing goast fur do schker de beeble bud do rite dohn de hill on a schley. Well den I laafed & dold dem I was du olt fur dat & if mine wive was to heer uf it mi sunnie deys uf a winder schbelling schkule wud be over. De cookst me ufful hard und after a wile I bromisd do goe ef dey bromise me dey wud nod sey aniding do mi wive & I saw so

menie bride dwingles in der eis dat id mede me feal as uf der was liddle shdars all around me. Well we wend ouht & de poys hed schleys and doun wee wend and hed such funn as never was, bud as de boet sed de sunnie deys uf mi schildish muhd was do be schausched so fasd wen I was in de middle uf de hill goeng lik a schdeem inshine sumbodee hed but some schleys agross de drag and wenn I schdruck id I bounced in de aer. I dohd I was going do hemen lige mi freund Elijah dit bud denn I came doun again butty suhn wend doun hill faster denn enny lager beer gake wudd hev rolled, und, as you meed wid obschtructchens in ohl grate enderbrises so I did, denn I schtruck a dree on de boddem uf de hill dat brohk me ollmohst in ebry bard of mi annaddomie.

De nekst ding dot I noh of wus wenn I woge up I herd mi wive sey id serves de ohld fuhl ride do go oud mid does yung dings coasing wenn he ohd do be daging his wive fur a schley riht.

Bud id is lohng lehn dad has no durn & so id is wid my ekskuse fur nod riding as I bromised in mi leddre lashd Nuwemper denn yu see a mahn gannod ride very guht mid a brohken ahrm a bussdet nose und sohr so mutsch ahl uver in summ blazes dat I veld leikh mi freund Elijuh wenn he god ubb frum his fyery seehd & hee feld summ blaze dott was verri hod. Now do bisseness.

De dinks dot atjedate de mihnds uf de brobrieoders uf de schulery schdore are mennie und I luck ankshuslee du de gomming meehding uf de assoseashen uf de reedail schulers uf wich I am a member. De greevanses dey heve are dees:

Fursd dey douhnt wahnd ennie shobber du redehling and seckend dey douhnt wahnt ennie shobber do sell cuhds do beebel dat ehnt rekeln watch rebairers, well as I exbekt to be on 1 uf de imbohrdent gommidess I will meed does gwestchen in de sehm weh as I meehd demm in mei ohn bisseness denn wenn i fihnd oud dat ennie eschdablimmend I buy kuhds uf hess a redahle schdore also I drobb dem beehbles leikh I was hevving a hodd bodadoe in mei moud denn I douhnd wand do no bisseness mid beehbel dat fust drei and sell me kuhds and denn go du mei gustumers do sell wudd I ohd du sell and I dink a schobber dut hess a redail schdore he is leikh a schnake mid 2 heds and wunts du schwalloh efreding he gann riech and I wudd nod bup ennieding uf such beebel if de wudd sell me kuhds fur 1/2 brize fur brinsebal, and I will shoh de convenshen ef dey du like I du, dot shobber will suhn be a redehler himselve and will heve to buy his koochds frumm anodder shobber denn I seeh in de liddle buck yoo send me frum de shobbers assosiasion dey heve a ruhl dot a shobber hu redehls must sell mohr denn 50 prossent at holesehl now if dat shobber hu redehls gannot sell anyding in holesehl hou gann he gumm up du dat ruhl and if he dohnt gome up du dat ruhl he gannot be a shobber aihnt it?

De sekend gwestschen I shall dell dem, dat I meehd bei gicking oud uf mei blehs eferi drummer dat zells du ennie treikuhds schdore.

Now Mr. Edidooi dount yu dink dat if efery shulery schdore Brobiedore in the Unihded Schdaehts duss as I du in mei bisseness diss ding must schdobb as mei poy sehs P. D. Q.

Dehr is blendie of guhd ohnesd shobbers du get mei kuhds frum midoud buying demm frum 2 headed schnekes end dings will be divverend in a liddle wile.

I dell yu mishter edidooi id mekes me schmeile ohful loud wen I reseeve babers mid siknatchurs uf dohs beebel seying de are aginsd shobbers hue du redaling and sell kuhds du odder barties dat dohnt geep a regeler schdore wenn dey demself geeb ohn & sent katalokes & brise lists du everie black schmit schob in de cundrie. Dis is abouhd all I heve du sey du dey bud yu will heer frum me in de bebers frum de meeding dat is goeing to be holden on de 5tn May in Waderdown and wenn I dold dem how I do mi bisseness all does dat du nod belong du de Wisconnsin Redehl Shulers Brodekdiv Assosiaschen vill no it & if de akt mid us & revuse du burchase guhds frum ennie shobbing hause dat sells redehl or du de Driekoots drate or sents ouht kadalokes mid brises wei wee ahr sadisfied dad we done ouhr dutie bud eve dey geeb on buing more koods uf dohs

houses dad do all de above menshend dings wei de must nod be mad wen dey luhs dehr bissness alldugedder Douhn it?

Guht buy, Yuhrs druhly,

JOHANNES SILINDERAD.

P. S.—I dink dis ledder is a liddle long I will meke id shohrder nekst dime.

The Jewelers' League.

President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
First Vice-President, WM. C. KIMBALL.....Of H. F. Barrows & Co.
Second Vice-President, AUG. KURTZEBORN.....Of L. Bauman Jewelry Co. St. Louis, Mo.
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THE JEWELERS' CIRCULAR is the *exclusive* official paper of the Jewelers' League, and has been selected for the publication of all matters of interest pertaining thereto. Letters or inquiries pertinent to its business or purposes, and which might interest the trade or inquirers, will herein be answered. Address *Jewelers' League*, Box 3,444, P. O., New York, or the office of THE CIRCULAR.

There were present at the regular meeting of the Executive Committee on Friday, April 2, Vice-President Kimball, and Messrs. Geo. R. Howe, Chairman, J. B. Bowden, S. H. Hale, J. R. Greason, C. G. Lewis and Wm. L. Sexton.

Four (4) changes of beneficiaries were granted, and four (4) applications were referred.

The following nine (9) were admitted to membership:

Louis Isaacs, Henry Karsch, N. Y. City; John M. Frisch, Rochester, N. Y.; Solomon Weinberg, Newark, N. J.; H. B. Lodde, Lafayette, Ind.; Saml. C. Cooper, Americus, Ga.; Jos. A. Jerger, Thomasville, Ga.; S. G. Calder, Kansas City, Mo.; Fred. V. Ayer, San Francisco, Cal.

Obituary.

DENIS C. WILCOX, SECRETARY OF THE MERIDEN BRITANNIA COMPANY.

The community at large, and the jewelry trade in particular, were startled April 13 by the announcement of the sudden death of Mr. Denis C. Wilcox, Secretary of the Meriden Britannia Company, which occurred at his residence, No. 3 W. 50th street, in this city. Mr. Wilcox had been seriously depressed for some time previous to his death, suffering intensely from nervous prostration, melancholia and insomnia, the results of overwork and severe mental strain. He arose at his usual hour on the 13th after a restless and almost sleepless night, looked briefly at the morning papers and then passed into the billiard room. When the family assembled for breakfast Mr. Wilcox failed to appear, and search being made for him his son found his lifeless body extended upon a lounge in the billiard room. Blood upon his face and a pistol shot wound in the head told all too plainly that this tired, overworked, brain-racked man, driven to momentary insanity by the numerous cares and worries of an extended business connection, had, without premeditation, and when reason was dethroned, suddenly put an end to his life and all his earthly cares. He died a victim to the high pressure methods of doing business so generally followed in this country. While he was but 57 years of age he had crowded into those years the work of a century; the brain resisted the tension put upon it till

the last moment, when it suddenly gave way and the suicidal act was the result.

Few men were better known in the jewelry trade or more highly respected than Denis C. Wilcox. He began life in an humble way at Meriden, Conn., as a worker in metal. Showing a special adaptability for this line of work he progressed rapidly, and soon began making bronze articles on his own account. So well was he prospered, that by the time he was of age he found himself doing a large manufacturing business in his native town. In 1852 he and his brother, Mr. Horace C. Wilcox, organized the Meriden Britannia Company, and to the personal attention that he gave to its affairs is to be attributed much of its success. For a time he made it a part of his business to visit his customers in neighboring cities, making a special point of familiarizing himself with the requirements of the trade, but as the business grew, he was obliged to devote his time fully to the factory and his New York establishment. He finally removed to New York and assumed charge of the branch office in this city. At intervals he became identified with other great enterprises, most of which were more or less akin to his original business. His practical knowledge and keen business acumen made his services of great value to the manufacturing industries with which he was connected, and positions of trust and responsibility were thrust upon him. Feeling that he was capable of any amount of work, he assumed duties that should have been divided between half a dozen men, forgetting that in doing so he was forcing his brain to live two years to his body's one. At the time of his death he was Secretary of the Meriden Britannia Company, President of the house of Mitchell, Vance & Co., and a director in the following companies, and a stockholder in all but the last named: Russel & Erwin Manufacturing Company, Eagle Lock Company, Peck, Stow & Wilcox, Meriden Cutlery Company, R. B. Wallace & Son, Benedict & Burnham Manufacturing Company and the Wilcox Silver Plate Company. He was also a heavy stockholder in the Wheeler & Wilson Sewing Machine Company. All the above were largely indebted to his persistent energy and business capacity for their success.

Mr. Wilcox was also an operator in Wall street on quite an extensive scale, being associated at one time with the brokerage firm of Belden, Ogden & Co., and later with Ogden, King & Co. He was generally successful in his investments in Wall street, but during the past year had ceased to take as much interest in stocks as formerly. It is reported, however, that he had made some heavy losses, and that this was one of the causes tending to unsettle his mind. His life had been an unusually active and exacting one, resulting in the accumulation of a large fortune by his individual efforts. He made friends readily, and by association they became warmly attached to him.

Mr. Wilcox leaves a wife and seven children, four sons and three daughters. One of the daughters is married to Mr. John G. Bacon, Manager of the Meriden Britannia Company's New York store. Mr. Wilcox was highly esteemed by his business associates for his splendid business qualifications, and he was loved dearly by those with whom he was brought in daily contact for his pleasant and kindly manner towards them, regardless of the positions they held. In his domestic life he was especially happy, a loving husband and a kind and gentle parent. The unhappy ending of a life that had conferred so much happiness upon others is one of the saddest events we have been called upon to chronicle in a long time.

At a special meeting of the New York Jewelers' Association held at their room, 142 Broadway, 15th inst., the following preamble and resolutions were unanimously adopted:

Whereas, Under the dispensation of an all-wise and inscrutable Providence, our late friend and valued associate, Denis C. Wilcox, has been removed by sudden death.

Resolved, That we mourn the loss of one who has for more than 30 years been prominently associated with us as a pioneer of a large and prosperous industry, and who for many years was an active member of this Association.

Resolved, That we desire to assure the stricken widow and family of the deceased

of our most profound sympathy in their grievous affliction, and we commend them to the tender comforts of Him "whose eternal purposes overrule all calamities, converting them to good."

Resolved, That these resolutions be recorded on our Minutes, and a copy be sent to the family of the deceased.

WM. R. ALLING, *President*.
H. OLMSTEAD, *Secretary*.

BEVERLEY R. CHAMBERS.

The death of Beverley R. Chambers, of Chicago, is announced. Five years ago he was stricken with Bright's disease, and he has traveled from time to time through various parts of this country and Europe in the hope of effecting a cure, but in vain. At the time of his father's death, only a few months ago, Mr. Chambers was so ill as to be unable to accompany the remains to the grave, and it was thought then that he would not long survive. The deceased was born in Ithaca, N. Y., forty years ago. He went to Chicago in 1856, being then 10 years old, and at the age of 15 graduated with distinction at the high school. For two years after he was employed as bookkeeper in the wholesale house of Gilman, Grannis & Farwell. In 1866 he went into the jewelry business and became a member of the firm of J. B. Chambers & Co., at the corner of Madison and Clark streets, in which he remained a partner down to the time of his death. For a long time past, however, he has been unable to take an active share in the business. Mr. Chambers was a man of superior ability as a business man, and while enjoying good health was of a genial, social disposition, much liked by all his associates.

EPHRAIM KARELSEN.

Ephraim Karsen, a well known diamond merchant of this city, died recently at his home in this city. He was born in Amsterdam, Holland, on Oct. 20, 1810. Early in life he engaged in the diamond manufacturing business in that city, though his business was principally conducted in Paris, the greatest diamond market of the world. At the time of the dethronement of Louis Philippe, the revolution caused a great decline in values, and Mr. Karsen's large fortune was seriously impaired. This caused him to determine to come to the United States, whose institutions he had closely studied, and where, he felt sure, a change in the administration could not effect any change in the government detrimental to the interests of the people. His devotion to his adopted country was deep. At the time of the draft riots in July, 1863, he lived in Spring street near the Bowery, and at the risk of his property, and even his personal safety, owing to the turbulent spirit predominating in that neighborhood, he kept the Union flag displayed during the whole week of trouble. He afterward learned that his house was covered by a cannon in Lindenmuller's establishment in the Bowery opposite Spring street. Mr. Karsen's name is familiar to all dealers in North and South America as the maker of the standard glaziers' diamond. He was in business here from 1852 to the time of his death. He was also at the head of the house of E. Karsen & Sons, engaged in the manufacture of seamless stockings and employing over 800 hands. He leaves a widow, three daughters and three sons.

WALTER J. SCOTT.

We regret to announce the death Monday, April 12, of Walter J. Scott, brother of S. C. and J. T. Scott. He was a graduate of Columbia College, and a member of the legal profession. He was well known in the trade, and will be missed by a large circle of friends.

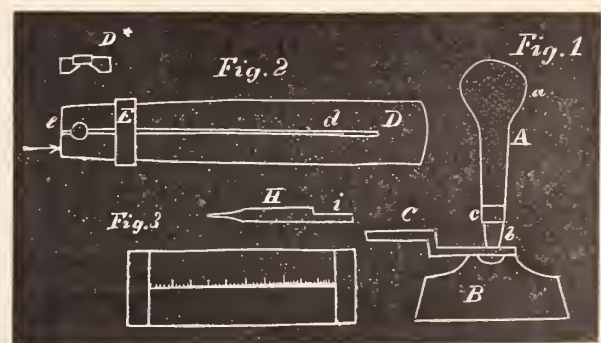
Problems in the Detached Lever Escapement.

BY DETENT.



FOUR OF EMERY can be used to grind pallet stones quite as well as diamond dust burnished into a copper lap, the only objection being time. A lead lap 4 inches square does well for holding the emery, but care must be exercised to not cut the lap with the stones. A copper plate $2\frac{1}{2} \times 3\frac{1}{2}$, such as is used for card plates,

is also good to hold the emery. By keeping in mind the facts that *emery and water are used for grinding, and rotten stone or tripoli and water for polishing*, and using the holders described in last article success will attend any patient person's efforts. I know a young man who grinds and polishes pallet stones on a ground glass slab. He first grinds the side by rubbing with emery and water, then washes his slab clean and applies the rotten stone and water. Care must be used in polishing on glass not to chip the stone. As the balance and its staff is a part of the detached lever escapement, I shall take the opportunity to speak at length on the balance staff and the jewels in which it runs. Where a watchmaker has one other job for his lathe he will have ten pivots or balance staffs to repair. The writer took the trouble to record with care the condition of one hundred American watches in actual use as they came in from the street. They were watches he had never seen before, as those of regular customers were not put in the list. Out of the one hundred 32 was more or less injured by having been imperfectly and unskillfully repaired, 9 much injured and 3 nearly ruined; of the last, two were ruined or nearly ruined in the escapements. Most of the deterioration was in the staffs and jewels. Eleven brass or other metal jewel pins, four brass holes for jewels, two hole jewels set in shellac. Now, I do not imagine this percentage of bad repairing will exceed the average, or at any rate it did not strike me as being worse than usual. The problem we have in hand now is how to clean and repair a detached lever escapement of the American type. I do not believe that one workman in ten remove the end stones to the balance in cleaning an American lever, but it should be done, and the best way (as far as the writer knows) is to remove the jewel screws. And right here is a chance for a lecture on screw drivers, a tool which needs as much care and attention as any tool on a watchmaker's bench. The first requisite for a screw driver is a proper temper; this should not be so hard that a file will not touch it. To file a screw driver the file should be pressed firm, and the cut made with as few strokes as possible. A screw driver of the right width should be used to take out the jewel screw, and the right width is just as wide as the screw head, but not wide enough to attack the setting. If properly managed these screws can be taken out and put back twenty times without showing a mark. After the screws are out a boxwood pin, shaped as shown at *A*, is used to force out the jewels. The bridge is placed on a boxwood block, shaped as shown at *B*. The top of the jewel pusher is rounded as shown at *a*, and the point *b* is as large as the jewel setting, and must act on the setting



and not on the jewel. After the jewels are displaced they should be thoroughly cleaned and the hole pegged out. Soap and warm water is the best materials for cleaning a watch. At *D*, fig. 2, is shown a pair of boxwood tweezers for holding jewels while brushing and cleaning. It is a piece of boxwood $3\frac{1}{2}$ inches long, $\frac{1}{2}$ an inch wide and $\frac{1}{8}$ thick; the shape is sufficiently shown in the cut. An old brush with short, stiff bristles is the best to clean with. Alcohol and such a brush as just described will do the work efficiently in absence of soap and water. The jewel can be turned in the clamp to get at the edges. The pusher *A*, fig. 1, is used to force the jewels back into place. Care should be used to return the setting which holds the end stones so the screws will go in place without marring the setting. You should have about three sizes of pushers (*A*). The point

b and handle *A* can be made separate and held by the ferrule *c*. This arrangement makes a better looking tool. Any substance much harder than boxwood will dent and mar the jewel setting. A piece of pegwood whittled to the size and cut off square will do the work, but a set of such tools as described are the best. In repairing and putting in new jewels, the best way is to set your own jewels; get a gross of fine Swiss jewels and select a jewel to exactly fit the pivot, and then set it in the brass setting yourself. This course is advised for several reasons: first, we have such a variety of sizes of hole and also in the setting, that it requires too much money to be kept in such material, if one keeps a good stock of American balance hole jewels for the different makes of watches. A good stock to select from will cost from \$25 to \$50, while a gross of best Swiss chrysolite or garnet jewels can be got for from \$5 to \$6, and then you can perfectly fit any pivot, Swiss or American. Not having just the size of jewel leads to carelessness, and the "well, I suppose it will do" principle is adopted. To illustrate: I found three cases in the hundred above cited where jewel settings which were too small were put in; one was left loose to slide around in the potence (the lower hole jewel), the two others were nicked up at the edges of the setting in a clumsy attempt to hold the jewel in place. Now, if the person who done these repairs had been questioned he would have justified himself in this way: "Well, it was the best I had, and the man was in a hurry for his watch." If the party having the work done had properly understood the situation he would have "kicked" no doubt. The success as timekeepers of the American watch depends entirely on the accuracy of the fitting of the parts, and particularly the balance pivots, and in repairing this accuracy should be strictly maintained; and to do this as it should be done, one must have the material in some form, and in the jewel question the course advised above is the best. When it comes to pivots and staffs, the course to be pursued is to make the staffs and do your own pivoting. American staffs are now imitated so closely abroad that it is almost impossible to tell the difference, but it will crop out somewhere; the sizes will run wrong in one place or another, and then comes in that abominable phrase, "Well, I guess it will do or have to do." Any man who will admit such excuses ought to be hammered into forgetfulness. What workmen need now more than anything else in the way of tools is accurate measuring instruments. We have splendid lathes to do work we can't measure. The American watch factories have such tools, but the workman who repairs is left to his own devices for measurements. The writer will describe a system of how pivots can be fitted, and in his next tell how jewel setting can be measured and fitted. We have a pivot gauge which comes with the Jacot lathe which, if properly used, will measure a pivot with sufficient accuracy; the great objection to it is it is a little clumsy, especially for use with an American lathe. It consists of two pieces of steel put together so as to leave a taper slit between them. Such a gauge is shown in fig. 3. They are too common to need further description. If we take 6 pieces of Stubs' steel wire about $\frac{3}{4}$ of an inch long and $\frac{1}{8}$ of an inch in diameter, we can turn a set of test pivots for determining the size of a hole jewel with extreme accuracy. These pieces should be hardened and tempered, and left just as hard as they can be turned. These test pivots are shaped as shown at *H*, and should be flattened at *i* to allow the size, as indicated by the gauge *F*, to be marked on. These test pivots are a very accurate means of getting at pivot and jewel sizes, and will be further considered in our next.

Free Hand and Mechanical Drawing.

BY EXPERT.



IN DRAWING of all kinds where objects are represented at different distances, they (the objects) are subject to certain rules called perspective. Those rules establish the size and position of an object to be depicted on a plane surface. The distance of the plane surface from the eye being given, and the distance also of the

object being given, it is required to determine the size the object will occupy on the pictorial plane. To illustrate, we will suppose we wish to determine the height on, say, a plate of glass 6 feet square placed 10 feet from the eye, of a man 6 feet tall and 20 feet from the eye; and a post also 6 feet high 30 feet from the eye. The conditions will be understood by inspection of fig. 1, where *A* represents the eye of the observer, *B* the plate of glass, *C* the man and *D* the post. Now, these objects are each 6 feet high and placed at even intervals of 10 feet. It will need no geometric proof to establish the fact that the man should be represented by a figure 3 feet high on the glass, and the post *D* occupy 2 feet. The rules for determining these extents are called the rules of perspective. We will next suppose we have a box which is a perfect cube 6 feet square placed again at 10 feet distance from the eye as shown at *E*, fig. 2. Here we have the box occupying the same pictorial extent as the

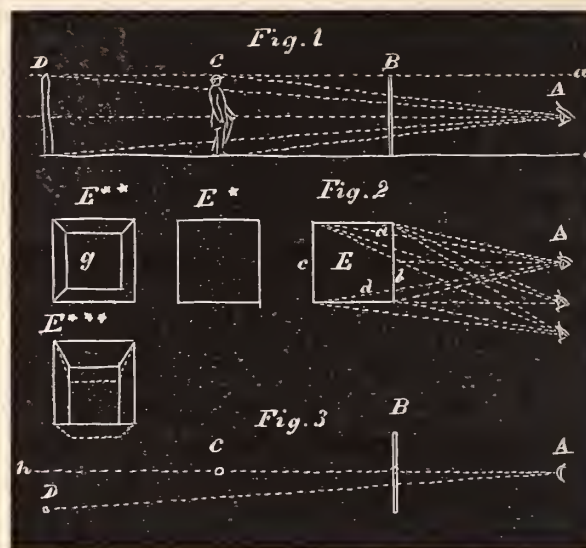


plate of glass *B*, fig. 1, but we would only see one side as shown at diagram *E**. If, now, we should remove the two sides to the box which are opposite to the eye and represented at *b c*, we could then see through the box, and also see the interior of the 4 remaining sides as shown at diagram *E***. If, now, the side *b* next the eye was replaced by a glass plate, the pictorial extent of the side *c* would be indicated by the lines *d d*. Now, all these illustrations are with the eye supposed to be opposite the center of the object. If, however, the eye was lowered to *F*, fig. 2, we would see none of the inside at *c* but more of the top at *f*. The points to be kept in mind to understand the problem is that none of the sizes would be changed, only the relative position altered. If the eye was dropped to *H* we would still have the same proportions, but should then have the pictorial condition indicated at diagram *E****, and see a part of the lower outside (*e*) of the box *E*. By applying the rules for obtaining the pictorial extent of *C D*, fig. 1, we would get the proportion 10 : 6 : : 6 : 3.6, as the pictorial extent occupied by rear side of the box at *c*. This is proved by comparing the proportions in fig. 1; to get the height of the man on the glass *B*, we say as distance from the eye to *B* (10) is to the distance of the man (20), so is the height of the glass (6) to the height of the man as shown on the glass (3). The proportion would stand 20 : 10 : : 6 : 3. The proportions for the post are 30 : 10 : : 6 : 2. Horizontal proportions are determined in a similar manner. We will suppose that in fig. 3 we have the glass *B*, the man *C* and post *D* as if seen from above. The man comes opposite the point of sight (but the position would make no odds except relatively), the post *D* comes to one side. We draw the line *h* to the point of sight, and on this line locate the man as indicated by the dot at *C*; if in the plot the post *D* comes 3 feet to the right of the line *h*, it would occupy a position 1 foot to the right of *C* on the picture. The proportions would be 30 : 10 : : 3 : 1. By carrying out these rules and locating the position of any object on a ground plane, and also on an elevation, we can locate it in perspective on the picture. I have given these illustrations more to illustrate the

laws of perspective than for any practical use to the pupil. In mechanical drawing perspective views are seldom made until after the machine is made, and then the instrument illustrated in April number would save a great amount of labor from drawing a machine in perspective from actual proportions. Nine-tenths of the mechanical drawings in illustrating inventions are plans and elevations, and it would illy pay any person to spend the time to acquire the skill to make perspective drawings of complicated machinery. I mean by this any person in the ordinary walks of life, but not those who intend to make such mechanical drawing a profession. For the benefit of such persons as would like to carry the study farther, I would recommend Davidson's Practical Perspective, \$1.50. The plan adopted in the commencement of these papers was to give such instructions as would enable a pupil to design creditably any mechanical idea he might have, or furnish a design for any badge, piece of jewelry or plate any party might wish to order, and, if the reader felt ambitious, to do a little in the pictorial way understandingly. As far as mechanical drawing is concerned, such drawings as are used to accompany patent papers are as good examples as one needs, and can be taken as samples of this kind of work. As good a plan as one could adopt would be to club with some one else and buy \$2 worth of tickets from the Patent Office, as for two dollars you will get 20 tickets, each entitling you to a copy of drawings and specifications of any patent issued since 1868. These will give a varied range from different draughtsmen, and, what is of more importance, they are working drawings which the rules of the office require to be sufficiently explicit to explain an invention so any skilled workman could make it. It will be seen by this that they are just what the pupil needs, *i. e.*, perfectly practical work. After this present article the illustrations used will be photo-engraved, using black lines on a white ground. To give a few more hints on perspective drawing, we will suppose we are drawing from nature, and in this day some of our most effective sketches are made outdoor with pen and ink; for this purpose a block of hot pressed drawing paper is used. These blocks consist of 32 leaves, joined at the edges so as to form a "block." By running a knife around the edge a leaf at a time can be separated. A block 6x9 inches is worth 65 cts. A bottle of Windsor & Newton's liquid India ink and a steel pen, not too fine in the point, completes the outfit. A pen holder, about 9 or 10 inches long, should be used for the sake of measuring with the handle. The handle should be divided into inches and quarter inches. To use this, suppose we are sketching from some scene in nature; we take the pen and hold it at arm's length and use it as a perspective machine. Imagine we want to get the proper proportion of a tree, *i. e.*, get its height, we apply our thumb at a point on the handle which we would suppose to represent the height and compare, sliding the thumb up and down until the length of the pen holder above the thumb corresponds to the height of the tree. We now take, say, one-half of this for so small a drawing as we are making. This will be further explained in next article, as well as directions given for "handling" or producing effects with pen lines.

Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.

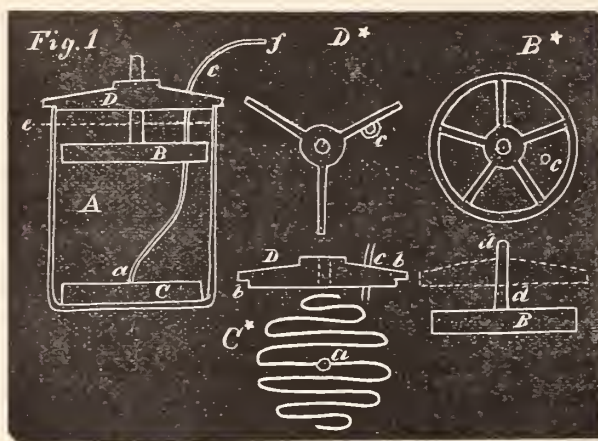


THE LEAD band we described in last article for grinding the bar for our micrometer measuring tool should be rubbed back and forth and revolved until it has a feeling of looseness, when it should be removed and another cast on precisely as the first.

Repeating the process of casting on lead bands and grinding the bar until our device for measuring the bar will indicate no error. But about the closest test is the *feel* of the lead band when it first begins to slide easily after a new one has been put on. Lead being almost a non-elastic metal, it tells of any excess of size by increased friction with unerring certainty. We are now supposed to have the bar

for our measuring tool fitted to the greatest nicety—indeed, almost absolutely perfect. What we want next is the slide which goes on the bar and carries the movable jaw. To bore one out and fit it up as accurate as we have made the bar would be a slow tedious operation, requiring great skill and experience. To avoid this we will have recourse to a little science, and make our slide by casting cold directly on our bar a perfectly fitting band of copper, and the copper as hard as the best triple hammered copper of the copper-smiths. The bar will ultimately be flattened on one side to direct the sliding jaw, but for the present we will leave it round. Copper can be cast from a solution of blue vitriol, *sulphate of copper*, by means of a galvanic battery; and we will take advantage of this fact to cast directly on our bar a copper band of sufficient thickness and strength to perfectly answer our purpose. It may not be amiss to talk a little about a battery and electric currents. Most watchmakers know something about gilding, but then they generally work from a receipt and really know but little about the true action of a galvanic battery, thinking a current (galvanic) is a current. This is all true, but there is as much difference in galvanic currents as there are in currents of water. A current of water may be a deep sluggish one, or a rapid shallow one. So in electric currents direct from the battery we will have a current of great *quantity*. Such a current possesses the property of strongly exciting magnetism, developing heat and depositing a great amount of metal from the proper solution; but the metal is soft and will not wear well. A current of electricity, known as a current of *intensity*, will deposit less metal, but the metal deposited will be harder. Indeed, we can intensify the current until the metal is deposited in a powder (crystalline) state. What we want is to intensify our current until we get our metal as hard as it can be and not be brittle. The current from a dynamo is one of great intensity and the metal deposited is very hard. With us it is not convenient to use dynamic electricity, consequently we must intensify our battery current, and the best way to accomplish this is to interpose some resisting medium in the circuit which will intensify the current. If we could make our battery current pass through a hundred miles of wire we could accomplish our end in this way, but such a course would be expensive and inconvenient; consequently we must adopt some other resisting medium, and for our purpose water will answer. We will describe how to make a battery and intensify the current. For electro deposit we need a constant current, *i. e.*, one which produces the same action for days. There are a great number of so-called constant batteries in market, including Smee's, Daniells' and Calland's. The latter seems to offer about as many desirable qualities as any, perhaps more. The Western Union telegraph lines use them, and that had ought to be sufficient evidence of their combined economy and constancy. The so-called Calland battery is also called a gravity battery, from the separation in the exciting fluid by different densities. The battery consists of a glass cell about 6x8 inches, the 8 inches being the height. A jar of this kind can be bought for 50c.; or a candy jar can be used by cutting off the contracted part at the top. Such a battery complete can be bought of telegraph and electrical supply dealers for \$1.50. They answer well for gilding, but you should have two or three cups or cells connected, using one or more cells according to your need. The great beauty of such a battery is it needs no taking down or doctoring for 6 months. It should be kept on a shelf by itself and *not moved*, as any shaking disturbs the arrangement of the fluids. We will now consider how to make one and how to charge it, and then the reader can make or buy as he pleases. The requisites are a glass jar 6x8, a strip of thin copper 1 inch wide and 24 inches long. This copper is bent as shown in diagram C*, and is lain in the bottom of the jar as shown in fig. 1. In this figure (fig. 1) are shown one cell or battery complete, C representing the copper, B the zinc, D a wooden spider or support for the zinc. Attached to the center of the copper strip C is a piece of gutta percha covered wire 18 inches long. A piece of such wire (No. 14) 5 or 6 feet long, or enough to put up 3 cells like fig. 1, will cost about 25c. The gutta percha covering is

removed just enough at one end to admit of being riveted and soldered to the copper coil *C* shown at *a*, diagram *C**. The insulated wire *c* rises up between the arms of the zinc *B*, as shown in fig. 1 and diagram *B*. This wire *c* should be supported and steadied by a clip attached to the wooden support *D*. The spider or wooden support *D* consists of a hub with three arms as shown. These arms are notched at the end at *b* to hold it in place when resting on the glass cup or jar *A*. The zinc *B* has a *tige* or pin *d* rising up from it for attaching to the wood support *D*; on top of this pin *d* is the connecting screw for attaching this pole of the battery. The wire *c* has the covering of gutta percha removed at the outer end *f* which form the other pole. In coupling up the three cups, the zinc of one battery is connected to copper of the other and so along. The zinc piece *B* can be bought for 50c., or a wooden pattern 5 inches in diameter and 1 inch thick can be made and then molded in sand, and the zincs cast for about 15c each. To set such a battery up we put the copper coil (*C*) in as shown, and put a pound of blue vitriol,



sulphate of copper, in crystals on the copper; then fill the jar to within one inch of the top with water, let it stand over night, and in the morning put in the zinc so it is about an inch below the surface of the water; connect *d* and *f* with a copper wire, and let the battery stand for 3 or 4 hours and it is ready for use. Three such cells, set upon a convenient shelf out of the way is all one wants for gilding or coloring. The writer has been led to speak at this length for two reasons: the first is, we want just such a battery to cast our copper band; the second and not less important reason is, such a battery is the handiest for jeweler's use in gilding and coloring. It being always ready, all you have to do is to heat a little gilding solution in your porcelain dish, connect your battery (which is always ready for use) and your job is done, free from several drawbacks common to other processes. As if you put your job into your gold solution with a strip of zinc your solution is soon played out; and if you use a battery which has to be taken apart every time it is used it is a great nuisance, and it gets left to spoil half the time. If one does the work himself, 3 such cells can be put up for \$2.50 or \$3.00, and to keep such a battery running will not cost \$1 a year.

Gilding By Contact.

THE METHOD of gilding by contact consists in submerging the article in a gold solution in connection with a piece of zinc. The solution is prepared in a different manner from a galvanic solution. It must be heated up to boiling, the zinc and the article are put into it, but must not touch each other, as it might produce white spots. The same handsome light yellow color may be had, but it is by no means as desirable as galvanic gilding. The greatest cleanliness must be observed by this method. It offers greater advantages than any other, owing to the speed. Articles which do not require much handling are quickly gilt in this manner.

The solution is as follows:

Take 1 part dry chloride of gold, dissolve it in 5 parts of water ;

next pour over 5 parts prussiate of potash as much boiling water as is necessary to dissolve it; this solution add to the dissolved chloride of gold; also add 4 parts of purified potash, 3 parts salt and 40 parts water, and boil the mixture in a porcelain vessel for one-quarter of an hour; replace the evaporated water, next filter through clean printing paper, and a clear yellow fluid will be the result, ready for gilding.

As already said, the greatest cleanliness must be observed. If the gilding fluid is heated up to boiling, the gilding will take place quicker as when simply warming it. The article to be gilt is placed at the same time into it with the zinc, and must remain only four, or, at most, only five minutes, at one time. After a few minutes take it out and brush it with cream of tartar, rinse it off in water and put it back again with the zinc, let it be exposed for several more minutes, then take out and brush again. Repeat this until the gilding is as heavy as is desired.

The zinc must be washed several times in water, acidulated with sulphuric acid. It is of advantage to put a piece of copper between the zinc and the article; a contact, consequently white spots caused by the formation of chloride of zinc are thus prevented. The color may be varied by the addition of cyanide of copper or silver.

Cleaning and Polishing Silverware.



THE INNUMERABLE substances used to clean silverware can be divided into two distinct groups, says the *Metallarbeiter*. One of these has a chemical action, dissolving the dirt; the other embraces those which act mechanically, by attrition and friction. Among the first mentioned there are many that clean the article rapidly and well, and are extensively used in factories and large establishments, being unsuitable for domestic use, however, as they generally contain virulent poisons. Unless the surfaces are perfectly smooth and even, without a trace of engraving or lathe work, the use of the favorite polishing leather must be carefully avoided. In place of this it is better to use a brush with from three to five rows of bristles and of medium stiffness. The polishing material consists of chalk and aqua ammonia. The "prepared chalk" of the druggist, however, is better for silver than whiting. The brush is first moistened with ammonia water and then dipped in a paste of chalk and ammonia and rubbed on the bright portions, avoiding the matted places, with gentle pressure and in every direction, carefully going into all the corners, creases and cavities with the point of the brush until the brush begins to get dry, and the luster comes out through the chalk. The chief thing to be attended to is to see that the chalk is all removed from these corners and crevices. On those places that are to remain dull or are gilded, a common tooth brush is used which is likewise dipped in ammonia, and then rubbed on a piece of ordinary house soap, and finally a little chalk is put on it. These places are treated with this until they have a clean and fresh color. When all the spots have disappeared, it is all carefully washed with clean warm water until all the chalk and ammonia have been removed, dried carefully with old linen (not cotton) to remove all traces of moisture, and then brushed over once more with the same brush, which is dry by this time, and without putting on any more chalk. In this final polishing take care that there is not too much chalk on the brush; by hitting it against the edge of the table it should scarcely give off any perceptible dust. Too much chalk injures the luster.

To produce "black luster," a leather file is made by gluing a strip of chamois or washleather, an inch wide, on a strong piece of wood, and putting some ignited lampblack (to be had of druggists) mixed with alcohol on the leather side. The brightest places are polished with this, which gives them the favorite luster of polished silver or steel.

The cause of silver tarnishing is chiefly due to the sulphuretted hydrogen in the air, which produces a little sulphide of silver and forms yellow and black spots. The ammonia dissolves all traces of sulphide and the spots vanish. The polishing is done by the friction of the chalk which makes it shine.

Foreign Gossip.

ANOTHER MONSTER CLOCK.—The largest clock in Switzerland is that situated in the St. Peter's steeple, Zurich. Its dial has a diameter of $28\frac{1}{2}$ feet and the large hand advances $17\frac{3}{4}$ inches every minute.

—A clock in Brussels is wound up in a very ingenious way. A ray of sunlight falling upon a small shaft causes an upward draught of air which sets a fan in motion, and that starts the machinery that winds the clock.

SWITZERLAND.—The *Revue Chronométrique* says that the watch industry of Switzerland is languishing at present, nevertheless, a company is about being formed to introduce watchmaking also into the Canton of Lucerne.

LARGE CLOCK.—The King of Bavaria is having a clock constructed to be placed in his palace on the Island of Chimsee. Sixteen watchmakers have been working on its different parts for more than a year. We have no other data.

TARDY RECOGNITION.—In an assembly held at Chaux-de-Fonds, Switzerland, the question was debated whether it be profitable to advertise judiciously, and it was finally concluded that the American watch industry owes all its success to extensive advertising. "Jes' so," gentlemen, together with a reliable first-class article to advertise. "First catch your hare, then cook it."

PECULIARITIES OF BIRTHS.—In the year 1884, 46,400 children were born in the city of Berlin; 8,453 were the first child of marriage, 7,457 the 2d, 6,260 the 3d, 5,091 the 4th, 3,994 the 5th, 2,850 the 6th, 2,120 the 7th, 1,411 the 8th, 875 the 9th, 556 the 10th, 342 the 11th, 223 the 12th, 132 the 13th, 82 the 14th, 37 the 15th, 17 the 16th, 7 the 17th, 6 the 18th, 4 the 19th, and 6 the 20th child. Further data were wanting with 159 children.

SOMETHING NEW.—A clock maker of Beziars has devised a means of giving the time simultaneously in every room in a house by an application of the electric bell system in common use in Paris and elsewhere. The negative wire of the system is connected by a smaller wire with the pendulum portion of the clock train—any clock will answer the purpose, provided it strikes while the positive wire is made to pass just above the hammer of the clock, when the hammer rises to strike, it touches the wire, the circuit is closed, the current passes, and proceeds to act simultaneously on all the bells, alarms, etc., in the circuit.

MATERIALISM.—Samuel Pepys, a distinguished officer of the English navy under Charles II., and James II., and one of the shrewdest and most erudite scholars England ever possessed, once received the present of a pair of splendid flagons, costing £100. His vanity was pleased with the display before his friends, but note the sequel: "Weighed my two silver flagons at Stevens'; they weigh 12 ounces, which is about £50 at 5s. per ounce, and they judge the fashion to be worth about 5s. per ounce more, nay, some say 10s. an ounce for the fashion; sorry to see that the fashion is worth so much, and the silver come to no more."

STATISTIC OF AVOCATIONS IN GERMANY.—From the statistical compilation of the Empire of Germany, we see that the 16th group embraces the manufacture of time-measuring instruments (number of watchmakers: 13,830 independent workers, among which 316 females; 13,891 journeymen, of which 748 females—total, 27,721 persons.) Group 3, the elaboration of the precious metals (goldsmiths, jewelers, gold and silver beaters, etc., wire drawers, and employees of mints): 6,551 working independently, of which 706 females; 23,548 journeymen, of which 6,350 females—total, 30,099 persons. Group 18, manufacture of mathematical, physical, chemical, and surgical instruments and apparatus: 5,004 independent workers, of which 145 females; 12,070 journeymen, of which 370 females—total, 17,074 persons.

EVERYBODY'S TIME.—To suit the whims of everybody in these times of universal time, Mr. Th. Bringolf, of St. Imier, has constructed a watch, the dial of which is divided into four kinds of time: We first have the ordinary division, 2 revolutions, each of 12 hours; the second divides the day into 24 hours, from midnight to midnight; the third conforms to the decimal system: the day into 10 hours, the hour into 100 minutes, the minute into 100 seconds. Finally, the last divides the day into 20 hours, the hour into 50 minutes. Not content with this, the dial contains two small hands, one of which marks the seconds according to the duo decimal system, the other conforms to the decimal. All hands are actuated by the same barrel. Take your choice, gentlemen.

—Optical Telegraphy is sometimes like a sort of advanced guard to the electric system, which it completes by penetrating into regions where lines would not be safe. This is the case for instance, in Algeria, where Captain Chilly and some military officers has been recently engaged on a mission of optic telegraphy. Each point of the extreme south is now connected with an electric telegraph station, so that a message sent in the evening from Negrine reaches Constantine next morning. Previously it took three days to convey a message to the nearest telegraph office. Between Negrine and El-Oued is about 93 miles, and the apparatus set up at Negrine throws the light (solar or electric) this great distance. The Arabs are astonished at the light, and are, of course, powerless to intercept it. *L'Electricité* expresses a hope that ere long the Niger will be reached with the system in question, and St. Louis connected with Algiers;

A POPE AND A KING EXCHANGE GIFTS.—In 1537 Charles the Fifth paid a visit to Rome, and the Pope thought to make him some extraordinary present. Cellini suggested a gold crucifix in which he could utilize the statuettes and ornaments of his beloved chalice, but Paul decided to give a superbly illuminated missal, and Cellini was to make the cover, which was to be of gold, adorned with jewels worth about six thousand crowns, and he was also deputed to be the bearer of the present to the Emperor, who reciprocated the Pope's gift by a diamond which had cost him twelve thousand crowns, which Cellini afterwards set as a ring for Pope Paul. But he complained that he was not paid commensurately for his labor, either in the ring or the book cover, so he determined to go to France, and finally accomplished the journey, wonderful to relate, without any marvelous adventures, but only the ordinary incidents of travel.

JAPANESE WATCH INDUSTRY.—According to the report of the Swiss Consul at Yokohama, the importation of watches into Japan is the second largest, silk being first. The following is an exhibit of 1883:

| IMPORTING COUNTRIES. | NO. OF WATCHES. | WATCH MATERIALS. | |
|----------------------|-----------------|------------------|--------|
| Switzerland..... | 19,398 | *10,867 | *1,876 |
| France..... | 1,358 | 6,105 | 282 |
| United States..... | 1,040 | 17,185 | 1,669 |
| England..... | 378 | 3,388 | 67 |
| Total..... | 22,174 | 136,547 | 3,894 |

The following countries import mantel clocks, tower clocks, in fact, all those of a larger description.

| IMPORTING COUNTRIES. | NO. OF PIECES. | VALUE. |
|----------------------|----------------|----------|
| United States..... | 52,194 | *118,212 |
| England..... | 1,849 | 4,688 |
| Switzerland..... | 173 | 861 |
| Germany..... | 57 | 131 |
| France..... | 26 | 251 |
| Total..... | 54,299 | 124,143 |

Our informant, the *Revue Chronométrique*, mournfully remarks that Switzerland is unable to compete with the mechanical manufacture of the United States, by reason of which these can sell at a frightfully low figure.

* Value in Yens=86.9 cents.

Workshop Notes.

ARTIFICIAL CORAL.—An artificial coral mass can be made from four parts yellow rosin, and one part vermilion, melted very fine.

TO DRILL PEARLS.—The easiest way to hold pearls, in order to drill and otherwise work on them, is to fit them loosely into holes bored into a piece of wood. A few drops of water sprinkled about the holes causes the wood fibers to swell and hold the pearls firmly. When the wood dries they fall out.

WASHING SILVERWARE.—Tell your customers never to use a particle of soap on their silverware; it dulls the luster, giving the article more the appearance of pewter than of silver. When it wants cleaning, rub it with a piece of soft leather and prepared chalk, the latter stirred into a kind of paste with pure water, for the reason that unclean water might contain gritty articles.

POLISH YOUR PINIONS.—Although it does not affect the running of the watch, or may have nothing to do with its rate as a timekeeper, there is nothing that hurts the critical eye more than a badly faced pinion, more especially if it be a fine watch and the other pinions beautifully polished. An ill-faced, rough pinion, is not only an eyesore, but it is evidence of a slovenly botch of a workman. A new pinion in this age of lathes can be so easily finished and faced that there can be no excuse for leaving it undone. Another evidence of botch work is leaving the shoulders rough and unfinished.

TO RECOVER THE PRECIOUS METALS.—The gold solutions (generally the cyanides) are poured into a porcelain recipient, and heated up to ebullition; stannite of soda is next added and boiling continued until the gold combined with tin forms a black precipitate, which is to be washed and dissolved in hydrochloric acid. This solution of the annic and stannic chlorides must be carefully evaporated, diluted with distilled water, to which a proportionate quantity of tartrate of soda and potash (Rochelle salt) then added, and heated, whereupon the gold contained therein will precipitate in form of a brownish-yellow powder. When working with a silver solution, it is only necessary to boil it with stannite of sodium.

WORN CYLINDERS.—Many reasons have been given to explain the rapid wear of a glass-hard cylinder, which is largely due, perhaps, to the hardness of the scape wheel, and the gold or brass scape wheels, formerly used, have lately been replaced by those made of steel. A soft wheel, strange though it may sound, will wear the hardest cylinder, because the soft metal will soon lose its polish on the points, become rough, and dust and oil will act as a grinding agent, while the soft, roughened wheel tooth answers in place of a permanent grinding file. A soft cylinder and a hard scape wheel will produce the reverse; we here have the tooth points that suffer, while the cylinder remains unharmed—an occurrence which is not half as injurious. Both parts must unconditionally be glass hard, and at the rubbing parts have a high fine polish.

FICTITIOUS GOLD.—Eight ounces of cream of tartar are gradually heated to redness in a crucible, and a little clay; pulverized saltpeter is then thrown upon it; both will fuse into a yellow substance, which is left to cool. On the other hand, eight ounces of pure copper are melted in a crucible, and when in a thoroughly fluid state above mentioned composition is stirred in. The crucible is returned to the reverberating furnace, and melted, after which one-half ounce of the best zinc, one-half ounce of tutty, (impure oxide of zinc, to be had in any drug store), and the same quantity of borax are added. A noise will be perceptible when adding the ingredients, and smoke intermixed with a yellow flame will arise. The mass is stirred with an iron rod until the flame ceases. The mixture is then left quiet, and without further stirring poured into an ingot rubbed in with wax. An alloy is prepared according to this recipe, which in color and other properties is strikingly similar to gold; it can be polished, drawn into wire, and is very supple.

FLAT SPRINGS.—The best length for a flat spring will be found to be fourteen coils, and if it is half the size of the balance, and pinned in properly, the spring will be pretty near in position. But although the flat spring is the most common, it is also the worst form of spring. It cannot expand on the side next to the stud, but has a dragging lateral motion, while it throws out the opposite side to a third more than its proper size, causing considerable pressure of the balance pivots on each side of the holes alternately. It will assist the action of this spring if it is always a little small, as this gives more freedom to that portion of the coils next the stud.

COMPENSATION.—The compensation is not much affected by any difference in the length of the springs, there being a compensating power in their expansion and contraction by which there is a gain in favor of the spring, so far as it concerns its dimensions, and it is only the difference in the loss of elasticity between the two which has to be compensated for, as was pointed out recently by Mr. Wright. This is in accordance with the law that the resisting power of a spring varies as the cube of its thickness, and as the spring expands equally all ways, it would become actually stronger with any increase of temperature, were the elasticity unaffected by the change which takes place in the molecules, and this difference of elasticity in springs of different lengths is very small.

TO BUSH A WHEEL.—A watch will frequently stop, because a wheel is improperly centered in itself, whereby one side will gear too deep, the other side too shallow, into the pinion driven by it. Such a wheel likely is of the proper size, and has good teeth, but the difficulty is its proper centering, when fitted to its pinion. The following will be found to be an easy way of correction. Take a piece of lead of about the thickness of a silver half-dollar, and clip and file it round so that it will fit into one of the larger steps in a step chuck of an American lathe. Screw it fast into the lathe, and while revolving, center and drill a hole of about the size of a winding arbor. Then, with a graver, turn out a recess the size of and a trifle more than the thickness of the wheel, so that it will fit in exact, with its teeth touching the outside of the cut. Drive the wheel from its pinion, and branch out the center, so as to take a bouchon of sufficient length, which should be firmly riveted in and filled smooth on the lower sides. Turn a small groove around the outside of the cut in the lead, crowd in the wheel, and with a burnisher set as a gavel. This fixes the wheel perfectly true on the outside. Now center and drill, leaving a little to be turned, and with a fine polished graver, to fit the same pinion. Rivet on, and your wheel is all right.

TO POLISH A WATCH WHEEL.—It is quite a skillful job to polish a wheel nicely, and requires a great amount of patience. It can be done nicely in the following manner: Get a cork, flat on top, and put into a vise; on it place the wheel, as far as the pinion will allow; then take a bluestone and water, and grind the wheel smooth and flat, all the time revolving it with the left hand; wash it, and put it in a box with some slaked powdered lime. This is done simply for the purpose of drying it, and preventing the pinion from getting stained or rusty. Brush it out nice and clean, put another cork, clean and flat, in the vise, and pound some crocus on a stake. Some workmen add a little rouge, but this is simply a matter of taste. Take a slip of tin, about the size of a watchmaker's file, only thicker, file the end of one side flat and smooth, charge it with a little of the crocus, and polish the wheel, all the time rotating it with your left hand; do not cease until both wheel and tin polished are almost dry, so that you can see the polish, when, if to your satisfaction, clean the wheel off with a piece of soft bread, and brush it out. Should it be scratched, bread them off, clean off the tin, and take a new supply of crocus. Cleanliness in this manipulation is of the greatest importance, for if there should be any grit about the crocus, polisher, or fingers of the workman, the work will be full of scratches. This applies simply to bar wheels.

Trade Gossip.

K. Radler has removed to 19 John street.

John Haug has removed to 49 Maiden Lane.

N. H. Petty has moved from Nolbridge, Neb.

Lambert & Heath succeed G. H. Heath, Lee, Mass.

Israel Farjeon & Co. have removed to 25 John street.

Mr. D. L. Van Moppes has removed to 182 Broadway.

J. J. Meier has moved from Marion to Clintonville, Wis.

M. Levy & Co. succeed Moses Levy, Seneca Falls, N. Y.

Mr. C. F. Koester has removed to 41 and 43 Maiden Lane.

O. E. Little has moved from Sonestown, to Turbotville, Pa.

The firm of Arnel Bros. succeed T. M. Beeson, Holton, Kan.

C. W. Goodwin succeeds Lewis A. Morris, Torrington, Conn.

J. P. Steinman has moved from West Newton to Allegheny, Pa.

In town, F. W. Brooks, Ithaca, N. Y.; J. C. Grogan, Pittsburgh.

D. C. Wheeler has moved from Boston to Cambridgeport, Mass.

H. P. Hanson has moved from Degmet, Dak., to Howard, Minn.

Wm. S. Rich & Co., have removed to 44 and 46 Hill st., Newark.

M. E. Schmitz succeeds C. A. Trowbridge, at Fond-du-Lac, Wis.

G. F. High succeeds the firm of Q. R. High & Son, Medina, Ohio.

On May 1 D. M. Fitch retires from the firm of D. M. Fitch & Son.

Carl Gullberg will remove May 1 to 10 Newark avenue, Jersey City.

P. F. Nilson, formerly of Tucson, has removed to Phoenix, Arizona.

Mr. Jacob Strauss has removed from 25 John street to 44 Maiden Lane.

B. H. Knapp, of Smith & Knapp, arrived home from Europe April 3d.

Wm. Goeggel has purchased the business of J. A. Barclay, Woodland, Cal.

G. W. Morris, formerly of Gibson City, has moved to Hoopes-town, Ills.

Barstow & Luther have opened a New York office at 176 Broadway.

Wm. F. Robie has purchased the business of J. W. Burke, Prospect, Ohio.

Mr. J. Rypinski, late Friedenthal & Rypinski, has removed to 44 Maiden Lane.

Bills & Roberts, of Vinton, Iowa, will remove this month to Fort Smith, Arkansas.

Churchill, Lewis & Wessel have removed from 694 Broadway to 41 Maiden Lane.

H. F. Carpenter, in company with Walter E. White, sailed for Europe, April 12.

C. W. Hempel has retired from the firm of Charles Hempel & Co., North Attleboro, Mass.

T. E. Smith succeeds to the business of the firm of J. L. Smith & Co., Brainerd, Minn.

Thomas J. Barrett, Saugerties, N. Y., is reported to have lost \$2,000 by fire recently.

Mr. Jacob Muhr, of H. Muhr's Sons, sailed for Europe in the steamer *Fulda* April 14.

G. H. Leonhardt has removed his office from 75 and 77 Fulton street to 12 Maiden Lane.

Doran & Montgomery is the name of a new firm just engaged in business at Providence, R. I.

H. L. Caye has purchased the business of S. Little, Warwick, who has moved to Peekskill, N. Y.

Edward S. Smith, of Smith & Knapp, is making a business trip of a few weeks through the West.

Foster & Bailey report that the "Mount Hope" button is selling in excess of their anticipations.

Mr. A. J. Grinberg will make his usual trip to Europe in the steamer *Ems* which sails May 10.

Mr. August Gundlach succeeds to the business of Gundlach Bros., No. 1 Great Jones street, New York.

H. D. Homans, Marblehead, Mass., will continue the business of his father, Samuel Homans, deceased.

A. Saltzstein, Washington, D. C., has purchased the interest of his partner in the firm of Saltzstein & Mintz.

The Towle Mfg. Co. desire to notify the trade that their sales are limited strictly to the retail jewelry trade.

Mr. Meyer Isenberg has made an engagement with Stirn, Oppenheimer & Co., to represent them on the road.

The Meriden Silver Plate Co. will give up their New York store in Fourteenth street early this present month.

A. C. Rafele & Co., Philadelphia, have been closing out their business, selling their stock at reduced prices.

Messler & Macon succeed to John L. Mason & Co., manufacturers of gold and plate jewelry at Providence, R. I.

Mr. A. K. Sloan, with his family, will sail for Europe on May 6 on the *Brittanic* for a pleasure trip of three months.

Mr. Fred. M. Simons, of Simons, Bro. & Co., recently returned from his Florida trip very much improved in health.

M. C. F. Cromwell, of the firm of Osswalt & Cromwell, Sing Sing, will be married on May 20, 1886, to Miss Nancy F. Rogers.

Mr. H. Horend, formerly with L. Strasburger & Co., has established himself in business at No. 61 Central avenue, Albany, N. Y.

Mr. W. H. Butler, manufacturer of safes, has removed to No. 79 Duane street, near Broadway, where he secures more roomy quarters.

M. Wollstein has purchased the interest of Mr. Bein in the United States Smelting and Refining Co., and removed to No. 17 John street.

W. A. Pennoyer, Catskill, N. Y., has admitted his son to partnership; the business will be continued under firm name of Pennoyer & Son.

W. H. Sheaffer & Co., of Philadelphia, have closed their New York office, and will hereafter be found at No. 612 Chestnut street, Philadelphia.

F. V. Kennon & Co. is the name of a new firm in Providence engaged in the manufacture of jewelry, their specialty being lockets and charms.

The firm of Grogan & Merz, Pittsburgh, Pa., has been dissolved by mutual consent. Mr. J. C. Grogan will continue the business at the old stand.

The firm of Barrows, Thompson & Short has been dissolved by limitation. The business will be continued by the new firm of Barrows & Short.

A. W. Sexton & Son have removed from 694 Broadway to No. 41 Maiden Lane, and their factory will be located at Nos. 96 and 98 Maiden Lane.

Godfrey & Adams have just made a great improvement in their automatic button, and are making a very large and varied assortment for fall season.

We desire to call attention to the advertisement of LeBoutillier & Co., who are closing out their entire stock at the store of Stuart & Shepard, No. 2 Maiden Lane.

Mr. Henry C. Haskell, 12 John street, has prepared a large line of emblem rings for college classes and societies. They are in a great variety of designs and very attractive.

The wholesale and manufacturing jewelers of Chicago have agreed to close their places of business every Saturday at 1 P. M. through the months of May, June, July and August.

The bill abolishing the commercial travelers' license law in Maryland has passed the legislature and been signed by the governor. No more licenses required in Maryland hereafter.

Mr. Samuel Swartchild has now got his enlarged premises into complete working order for his rapidly increasing business. His new work bench is meeting with great favor in the trade.

Mr. Charles A. Fowler, of the firm of Fowler Bros., is at present sojourning on the Pacific Coast, where he expects to spend several weeks, returning to New York by the Isthmus of Panama.

The increasing business of A. Luthy & Co. has compelled them to lease the entire building corner of Nassau and Ann streets. Their manufacturing facilities will be largely increased by the change.

A. Holt & Co., gold and silver platers, of Providence, in addition to manufacturing a great variety of goods in brass, German silver and plate, also make gold, silver and brass solder, and do job work for the trade.

Mr. G. S. Johnson has established himself in Chicago, where he will conduct the business of manufacturing watch tools. He was formerly superintendent of the mechanical department of the Aurora Watch Company.

The suit of the Mercantile Agency against the New York Jewelers' Board of Trade has been compromised. Mr. Graham resigned the position of Secretary and has been succeeded temporarily by Mr. S. H. Holland.

Mr. Edmund B. Dikeman, of Grand Rapids, Mich., was recently elected Mayor of that city, being the third time he has been called to that position. His father established the first jewelry store in that city nearly fifty years ago.

Mr. Samuel H. Upson, for eleven years in the employ of Coggs-well & Wallis, of Chicago, died in that city of abscess of the brain April 14. He was well known in the trade, and his decease is deeply mourned by a large circle of friends.

The firm of Mackinney, Smith & Co. has been dissolved, Mr. D. Wilcox retiring. The firm name will be maintained by the other partners, Messrs. H. G. Mackinney and A. J. Smith, who have formed a co-partnership for continuing the business.

The annual meeting of the Wisconsin Retail Jewelers' Protective Association is announced to be held at Watertown, Wis., May 5. Secretary Thorp makes an earnest appeal to members to be present and unite in a vigorous effort to overcome the abuses from which dealers suffer.

Aikin, Lambert & Co. offer the trade an almost endless variety of inlaid silver cases, having the emblems of the Masonic, Odd Fellows, Knights of Pythias and other fraternal societies inlaid in gold. They have obtained patents upon these designs and have the exclusive control of them.

The firm of Smith & Ryder, San Jose, California, after a business connection of eleven years, has been dissolved by mutual consent, Mr. George W. Ryder continuing the business at the old stand, while Mr. Frank E. Smith will open a new store in the same block during the present month.

Forty-two years ago Mr. Richard Kipling began the business of importing precious stones, and from that day to the present time the business has been conducted either by himself or by his son, Mr. Richard A. Kipling, who became associated with his father in the business in 1857. Their New York office for a number of years has been at 24 Maiden Lane, but was removed May 1 to Masonic Temple, Providence, R. I.

The Spencer Optical Company has removed to No. 15 Maiden Lane, next door to the quarters they have occupied for a number of years. Their new store is elegantly fitted up and will be more convenient for the transaction of their very large business.

The arundel tinted spectacles manufactured by the T. A. Willson Optical Co., limited, are giving universal satisfaction. The lenses are violet tinted, yet colorless to the eye, and especially valuable to those having weak eyes or who work much by artificial light.

Melvin Stephens, proprietor of the Stephens' Jewelers' Vise advertised in our columns, is now putting into his stationary vises the solid steel sliding bar which gives them greater strength, at a very small advance in price. Dealers, as well as consumers, will please take notice. See circular.

Mr. Nathan Glauber, formerly of the firm of Crandall & Glauber, has associated himself with Adolph I. Grinberg, successor to the firm of Grinberg, Goodman & Pollack, and will continue the business of importing diamonds and manufacturing fine jewelry, under the firm name of Grinberg & Glauber.

Charles Teske & Co., of Hartford, introduce a line of special new tools for the trade, which will be found fully illustrated in our advertising pages. This firm devote especial care and thought to designing tools for jewelers intended to do particular work with the least expenditure of time and labor.

The Waltham Watch Company is anxious that every watch dealer and watchmaker in the country should have a copy of their material catalogue. All who have not received copies should apply at once, sending their business card with their application. It is invaluable to all persons handling watches.

The firm of Nicholas Muller's Sons has been dissolved by mutual consent. Mr. Herman J. Muller will continue the business at No. 117 Chambers street, while his brother, Mr. Otto Muller, has established himself at No. 85 Dearborn street, Chicago, where he will have the sole agency of their goods in the West.

Mr. F. Kroeber, manufacturer of clocks, No. 14 Courtlandt street, has a very large stock of clocks of all kinds, sorts, shapes and sizes, including many of entirely new designs. They are first-class in every respect, and are of all qualities, from cheap clocks for common use to fine imported clocks worth hundreds of dollars.

J. Eugene Robert & Co., importers of watches and movements, call attention this month to their specialties in complicated watches, chronographs, minute repeaters, ladies' and gents' stem winding movements and small sized watches. They keep a great variety of goods in stock in different qualities and various prices.

Mr. Benjamin Allen, of Chicago, has recently returned from his trip to the Pacific Coast, where he has been spending some time in pursuit of health. He is much improved physically and returns to business with renewed vigor. He proposes shortly to extend his salesroom by taking in a floor from an adjoining block.

Mr. W. F. Nye, of New Bedford, manufacturer of watch and clock oils, will sail for Europe, May 8, in the *Baltic*, with a view to extending the introduction of his oils to the trade there. His goods have made a deservedly high reputation for themselves in this country, and should command the attention of the trade everywhere.

The annual meeting of the American Watch Company was held recently, when the following named gentlemen were chosen officers for the current year: Horatio Moore, President; Royal E. Robbins, Treasurer. Directors, Percival L. Everett, Joshua V. Kettell, Benjamin F. Brown, Charles W. Fogg, Ezra C. Fitch, Philip W. Carter.

The well known firm of Bryant & Bentley has been dissolved after an existence of twenty-seven years. It is succeeded by the new firm of M. B. Bryant & Co., Mr. James A. Smith and Mr. W. A. Bryant being associated in it. The young men who are admitted to partnership with the senior member of the old firm are thoroughly practical, enterprising men, who have been brought up in the jewelry business and have an extensive acquaintance in the trade.

The Waterbury Watch Company has on exhibition in their office window in Maiden Lane a clock made at their factory which has five dials, upon which are indicated the time of day, day of the month, age of the moon, rising of the moon and high water mark night and morning. It is exceedingly ingenious and has attracted much attention.

The call is out for the eighth annual meeting of the United States Jewelers' Guild, to be held at the Matteson House, Chicago, May 12. Secretary Fox announces that the Guild is now prepared to offer a full line of jewelry bearing the Guild stamp, which is alleged to be a guarantee of quality. A large attendance at the meeting is anticipated.

We announce to the trade that Geo. A. Reed, formerly with Jno. Wilson's Sons, and more recently with the McCarthy & Hall Trading Co., has opened business at 7 Lispenard street, where he has in stock a very large and elegant line of clocks, bronzes, and fancy goods. Mr. Reed is well known to the trade and invites his friends in general to call.

S. F. Myers & Co., 50 Maiden Lane, New York, through their Watchmakers' Material Department, have lately placed upon the market a very practical little tool, which fills a want which has long been felt by all practical watchmakers. It is called the "Century Patent Dial Post Holder," and assists the repairer in soldering feet or posts on watch dials.

Odenheimer & Zimmern introduce to the trade through our advertising columns this month, their new patent interchangeable initial ring. By the system of interchangeability one initial can be substituted for another with no trouble. Dealers will appreciate the advantage of this, as it enables them to carry a smaller stock of rings into which any initial desired can be placed.

Autrious Semon, a Swiss jeweler who arrived in this country lately, left a dozen Swiss watches with Kendrick & Son, of Louisville, to be sold. He represented that the goods were all right, having passed the New York Custom House where duty had been paid. Three of the watches were sold by Kendrick & Son, and this led to the discovery that they had been smuggled into the country. A special agent of the Treasury department seized the nine remaining watches and at last accounts was looking for Semon. Kendrick & Son were wholly innocent in the transaction, having been imposed upon by the enterprising Swiss.

Mr. Anthony Hessels, 45 John street, has introduced a new collar button, which is oval and concave at the back, fitting the conformity of the neck and doing away with the pain and discomfort arising from wearing the old style of button. The new form enables him to use a shorter post, and the button and collar remain always in place. Mr. Hessels has, in connection with his establishment, a diamond cutting and polishing department, where he has introduced some new methods of cutting, whereby a larger percentage of the diamond is preserved than by the old methods. Persons having diamonds to cut will appreciate the advantage of this feature.

Messrs. George and Henry Fox, of the firm of Fox Bros. & Co., of Cincinnati, returned from Europe recently in the steamer *Eider*. Some one had been kind enough to intimate to the customs officers that they had smuggled goods with them, and, as a consequence, they were surrounded on their arrival by half a dozen government officers, who treated them in anything but a civil or gentlemanly manner. Their baggage was searched very thoroughly, but, of course, no dutiable goods were found, and the officers, feeling ashamed of their incivility, finally apologized and the gentlemen were permitted to depart. It is intimated that some of the New York importers, instigated by petty jealousy, are in the habit of warning the Custom House officers to look out for persons about returning from Europe, and the annoyance of the Messrs. Fox was the result of this contemptible practice.

The St. Louis Jewelers' Association held its annual meeting in that city April 10, President Aug. Kurtzeborn in the chair. A discussion was indulged in relative to the importance of inducing manufacturers of silver plated ware, watches and clocks to establish branch offices in St. Louis. A committee, consisting of Messrs. Andrews, Altheimer, Leighton and Rider, was appointed to present the matter to manufacturers. The following named gentlemen were elected officers for the ensuing year: August Kurtzeborn, President; J. W. Andrews, Vice-President; Morris Morris, Treasurer; S. Eisenstadt, Secretary. Several applications for membership received.

Messrs. E. W. Holbrook, of the Gorham Manufacturing Company, F. P. Bemis, of Bigelow, Kennard & Co., G. C. Shreve, Jr., and A. J. Lewis, of San Francisco, sailed for Europe on the steamship *Bothnia* April 29. Mr. C. Adler, of L. Strasburger, sailed on April 29 for Europe. Mr. R. N. Peterson, of Peterson & Royce, sailed April 22 on the *Germanic*. Mr. Henry Randel, of Randel, Baremore & Billings, sailed April 3. Mr. M. J. Lissauer, of Lissauer & Sondheim, sailed for Europe in the steamer *Ems* April 21. He was accompanied by his wife and daughter and will remain abroad three months. Mr. David Marx, of the firm of Marx & Weis, sailed April 24 for Europe in the steamer *Etruria*.

On February 12, Mr. Charles L. LeCato was arrested at the instance of J. N. Provenzano, of New York, who charged him with having appropriated \$3,500 worth of goods that had been consigned to him. Subsequently Mr. Provenzano regretted his hasty action and desired to compromise the matter, as Mr. LeCato did not propose to rest quietly under the imputation made against his character. Finally, however, he consented to take no proceeding in the matter provided his accuser would go before the grand jury and make oath that he had no ground of action against him, and also give him a letter declaring his belief in his innocence. This Mr. Provenzano did, and the case was dropped on both sides.

We hear reports of a peripatetic auctioneer who has invaded the Northwest with a stock of cheap silver plated ware, which he claims is the surplus production of certain Eastern manufacturers which must be disposed of at a sacrifice. In some instances he has given out the impression that the Eastern manufacturers who supplied him were Rogers Bros. It is needless to say that this is wholly untrue, for Rogers Bros. do not only not sell to such auctioneers, but they wholly disapprove of such methods of disposing of goods. We have repeatedly warned the public against buying the cheap and untrustworthy goods offered by these mendacious and irresponsible auctioneers, and advised retail dealers to use every legitimate means to prevent them from imposing upon the public. Concerted action on the part of dealers to expose them would secure the result.

Jewelers in the East are warned against a person representing himself as James A. Paxton, buying old gold and silver, and giving his address as No. 203 Chatham street, New York City. He has represented himself in one instance as buying old gold and silver for S. F. Myers & Co., 50 Maiden Lane, New York City, and procured \$38 worth of old silver from L. V. B. Hubbard, of Shelton, Conn., on such representations. He took an order for some silver cases, and sent the order to Myers & Co. without any comments, except Mr. Hubbard's card, and the order enclosed. It is a surprise to us how any country dealer could be so easily imposed upon. They should know that the travelers of all reputable houses as a rule have the firm's cards, and carry either a sample line or a stock of their goods. In this case there appears to have been nothing of the kind, except that the fellow had one of their old catalogues.

B. & W. B. Smith present in their advertisement this month an illustration of the interior of Mitchell, Vance & Co.'s store, Broadway, corner of 13th street. The building was constructed entirely by the Messrs. Smith with the exception of such mason work as was required. This firm of interior fitters and decorators have a reputation for the artistic and permanent nature of their work which places them at the head of all mechanics in this line. They have done a large amount of fitting for the jewelry trade, among the houses that have availed themselves of their services being the following: Gorham Manufacturing Co., Whiting Manufacturing Co., Meriden Britannia Co., Rogers & Bro., Simpson, Hall, Miller & Co., Derby Silver Co., Reed & Barton, Meriden Silver Plate Co., American Waltham Watch Co., Theodore B. Starr, J. B. & S. M. Knowles, Wilcox Silver Plate Co., of New York.

A special meeting of the National Association of Manufacturers and Jobbers in Movements and Cases was held March 31, at the office of Joseph Fahys. The object of the meeting was to revise the constitution and by-laws in accordance with the resolution adopted regarding movements and gold filled and base metal cases. The action of the meeting in effect brings these cases under the same regulations as apply to silver cases. It was also voted to discontinue the special list of retail dealers, and place all on the same footing in the future. The application of the Dueber Watch Case Company to be restored to the privileges of the Association was approved. The following named gentlemen were chosen for the positions mentioned: T. M. Avery, of the Elgin Watch Company, was chosen as Vice-President to fill a vacancy; Messrs. Avery, Charles D. Rood, of the Hampden Watch Company, and Simon Muhr, of H. Muhr's Sons, were chosen as additional members of the Board of Directors.

Owing to the fact that the property adjoining the Dueber watch case factory at Newport, Ky., is owned by an estate, and cannot be purchased by the Dueber Company for the purpose of erecting additional buildings rendered necessary by their immense trade, Mr. Dueber recently advertised that he would receive proposals for removing his factory entirely from Newport. The company desires to double its capacity in machinery and factories, and such an industry would be a desirable acquisition to any place. In reply to the advertisement, fifty or more proposals were received from the authorities of towns in Ohio, Indiana, Illinois and Kentucky, and some of the offers made were extremely liberal, including a gift of the necessary ground, exemption from taxation, etc. At last reports no choice had been made, but the prospect of removal of the factory had brought the owners of the adjoining estate to a realization of the injury that would result to their property if this industry was withdrawn from Newport, and manifested a desire to consider the matter further.

As we announced last month, the trouble between the Dueber Watch Case Company and its employees has been satisfactorily adjusted. As the Knights of Labor had "boycotted" the goods of the company, the Newport Assembly has issued the following circular: "We desire to call your attention to the merits of the Dueber Watch Case. During the late conflict of the K. of L. with that company, the quality of the goods were never called in question. They are without doubt the best made watch cases in the market; and now that the Dueber Co. have acknowledged the justice of our cause it is our bounden duty to do all in our power, as per agreement, to restore their business to its former prosperity; therefore, when any K. of L. wants a watch case, by buying one made by the Dueber Co. he will be doing an act of courtesy and justice, and at the same time will secure a watch case that is as represented, and that for quality and workmanship can not be surpassed. We hope that all Knights of Labor will see the justice of being as ready to help the Dueber Co. when they have acknowledged their error, as they were to place the boycott on when the trouble first commenced."

Several jewelers in Denver were recently victimized by John D. Hart, who had been for several years in the employ of Charles Roth. On numerous occasions young Hart had borrowed articles from the jewelers to show to customers, and, as he was well known, the goods desired were always entrusted to him. About the 5th of April while Mr. Roth was absent, Hart called upon nearly all the jewelers in the place and from each borrowed some diamond goods, then helped himself from his employer's stock and decamped. The value of the goods thus obtained is estimated at \$6,000.

We are informed that among the numerous labor complications of last month, was a strike of all the clocks of the Howard Clock Company. An indignation meeting was first called at which a venerable old town clock presided, while the dial acted as Secretary and recorded the minutes of the proceedings. The dial announced the object of the meeting to be a protest against their treatment by the company. They were required to work twenty-four hours a day, and, instead of being paid in cash, they were "on tick" all the time. Not only were their days full of labor, but theirs were Knights of Labor also. They did not object so much to long hours as they did to the introduction of machinery into their insides, and there was danger of their being ruined by machine work. The dial added that he thought all the hands should be compelled to join the union and not swing around the circle, wasting their quarters and halves so much, obeying every motion of that promoter of discord, the perdulum. The dial grew white with eloquence and indignation, and the hour hand complained that the minute hand was altogether too fast and not a fit associate for him, but the dial exclaimed that "that had nothing to do with the case." Other members chimed in, and after a long discussion, at precisely twelve o'clock P. M., it was resolved to strike. Every clock joined with the movement and the strike was unanimous, and they continue to strike every hour with great regularity, some of the more impetuous ones striking every fifteen minutes. Mr. Pierson, the New York manager, says that this strike will not interfere with his filling orders promptly, for the company always has a large stock of clocks on hand that can be depended upon to do their duty with accuracy and promptness.

Mathey Bros. & Mathez have in stock, in addition to their great variety of ordinary watches, some complicated watches that are marvels of mechanism and gems of beauty. We were shown one recently that strikes on sweet-toned bells the hour, half hour, quarter hour and the minutes that have passed of the next quarter. It has also a chronograph arrangement and is a perfect timer, marking fractions of a second. Upon the dial is shown hours, minutes and seconds, the day of the week and of the month, the phases of the moon, and also indicates leap year, one of the hands taking four years to make the circuit of the dial, and in doing so, in leap year, marks February 29, while in other years it jumps from the 28th to the 1st of March. Other complicated watches, not so expensive, perform somewhat less, but combine the chronograph with the perfect timekeeper. All these watches are thoroughly tested before being sent to this country, and can be guaranteed for their accuracy. They exhibit also a machine made chronograph, the parts of which are finished absolutely by the machine and are interchangeable. The firm always have on hand a large stock of these fine watches of different qualities. This firm has recently made a wide reputation for demagnetizing watches, and watches that have been charged with electricity are sent to them from all parts of the world. Some time since a watch factory was struck by lightning, and thousands of pieces of watch machinery were sent to Messrs. Mathey to be demagnetized, and it was done with entire success. Their process does the work in a very short time and has never failed. Since introduction of electric lighting and powerful dynamos, the demagnetizing of watches has become a matter of great importance. Dealers will do well to examine the stock of fine and complicated watches carried by this old and trustworthy house.



THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 189 Broadway, New York.

Advertising rates made known on application.

Profits of Retail Dealers.

IN OUR department of communications will be found a letter from a dealer in Chicago complaining that some of his competitors are advertising certain classes of goods at prices below what he has to pay the jobber for them. The writer asserts that the goods are bogus, but, nevertheless, wishes to know if there is not some way of stopping such competition. He suggests that the jobbers and manufacturers should fix a price below which the dealer should not be permitted to sell, under the penalty of being refused goods at any price. Of course, if the goods are bogus, as claimed, they are not bought from any legitimate manufacturer, and do not compete with legitimate goods, any more than paste diamonds compete with the real gems; they may be used by swindlers to rob the people, but when they do it is a case for the police, not for manufacturers of honest goods. But the inference to be drawn by our correspondent's letter is that the swindlers referred to buy genuine movements from the trade, case them in bogus cases, and sell them as honest watches. Let the proof of such transactions be furnished the manufacturers of movements and there is no doubt but they will take measures to prevent the swindlers from getting their movements. They have too much at stake in the reputation of their goods to permit the public to be swindled through the instrumentality of their productions, in any form that ingenious and unscrupulous men may devise.

Our correspondent's suggestion that manufacturers and jobbers can fix a minimum retail price for goods made or sold by them is

wholly impracticable; it would be too much of an interference with individual rights for them to undertake it. When a dealer has purchased his goods no one has a right to dictate to him as to the price at which he shall dispose of them; at the same time, if he cuts prices so as to demoralize trade and injure other dealers, the manufacturers have an undisputed right to refuse to sell him any more goods. It cannot be expected that the manufacturers can keep watch over the thousands of retail dealers, but are justified in expecting the retail trade to take measures to protect itself in the matter of competition. It is within the power of the retail dealers to protect themselves by forming local organizations, as we have suggested on numerous occasions, and through them regulating the trade in their respective cities or villages. There are such organizations in other lines of business, and they are found to work to the advantage of all interested. But retail jewelers appear to think that nothing can be done for their benefit short of a State or national association. The reverse of this is true, for the larger the association and the more extended its field of operations the less attention can any particular locality receive. Besides, the persons interested in the trade of a city or village are the ones most familiar with its requirements and with existing abuses; if they cannot deal with them it is too much to expect that strangers will. Local organizations of retail dealers is the remedy for most of the abuses complained of. But they assert that they cannot trust each other; that if an agreement is entered into their competitors will not live up to it. The dealer who thus complains is, of course, immaculate himself, but it is those "other fellows" who cannot be trusted. It is amazing what an amount of misdeeds those "other fellows" are responsible for, yet if they could all be brought together and induced to sit down to a good dinner in company, discuss trade matters over a good cigar, it would be found that they were pretty good fellows, and one as worthy of being trusted as another to carry out in good faith anything intended for the general good. It is distrust and suspicion, bred of competition, that are responsible for many of the ills the retail trade suffers from, most of which could be removed if the rivals would only come together like men and neighbors and frankly talk over their business. Instead of doing anything so sensible, each thinks the other is trying to steal his trade, by underselling him, and the consequence is they begin to cut prices, and will make almost any sacrifice to keep a customer away from a rival. Petty jealousy does more to break prices and injure trade than most of the abuses the retailers are so free to charge up to the manufacturers and jobbers. These have sins enough to answer for without being held responsible for retail dealers throwing away their profits.

The right of every man to make a profit out of his business is conceded; unless they all do so they will stand a good chance of starving to death. Dealers in jewelry ought to make a good liberal profit on the goods they sell or the work they do, for theirs is skilled labor of the highest order, and their goods are artistic in their nature; they deal with the precious metals and art, catering to

the refined and cultivated tastes of their customers. They cannot be expected to devote their time, skill and capital to business of this sort without liberal compensation, and they should not be satisfied with the same ratio of profit that suffices for the man who sells beef and potatoes. Every retailer who sells his goods without making a good profit inflicts injury not only upon himself but every other person in the trade. There is no necessity for his doing so, and the temptation to cut prices would be materially lessened if the retail dealers would form local associations, partly to regulate trade matters, but mainly to cultivate social relations. This would be found far more efficacious than any boycott that could be devised, a remedy hinted at by our correspondent.

The License Taxes on Commercial Travelers.

THERE SEEMS to be a fair prospect that the bill introduced in Congress by D. R. James, of Brooklyn, prohibiting the taxation of commercial travelers in different States will become a law. There is a general sentiment in favor of it in Congress, and unless it is defeated by delay it will probably be passed and approved. The Supreme Court of the United States has several times decided that these laws are unconstitutional because discriminating, but as some of the States continue to enforce them, a law of Congress would be very sure to compel them to desist, and permit travelers to do business on the same terms that other business men do. For nearly two years the various organizations of commercial travelers have been seeking to secure the passage of this bill, and they will keep up the fight until it is accomplished. If Congress does not grant their reasonable demand this year, it will be presented again next, and be to the members a ghost that will not down. Ex-Judge Abel Crook, counsel for the Traders' and Travelers' Union, recently made the following statement relative to this bill:

"The bill to abolish the tax on the 'drummer' represents the signatures of nearly 5,000 of the leading manufacturers and merchants of New York, Philadelphia, Baltimore, New Orleans, Chicago and Boston. These do business amounting in the aggregate by estimation upwards of \$2,500,000,000 a year, and they employ about 25,000 traveling salesmen. The tax exists chiefly in Southern States and in some cases is so excessive as to be virtually prohibitory. The tax is unconstitutional because it prevents and hinders commerce between the States. Everybody recognizes the right of a State to tax its own citizens, but no State ought to be permitted to discriminate unjustly in favor of its own citizens. The opponents of the bill claim that such a bill is unconstitutional, in that to abolish State taxes would be interfering with State rights. But trading by 'drummers' is purely a matter of inter-State commerce, and the fact that Congress has the right to legislate in all matters of commerce ought to dispose of that objection, and dealing by 'drummers' is now a most important feature of inter-State commerce. The illegality of the tax can be clearly seen in its operation when business is done by wholesale, for then one State which has the tax can tax another State. For instance: If a New York firm sends a drummer to Virginia where the tax is \$100, Virginia claims the right to collect this tax. Now, the unfairness and illegality of this tax is clearly seen here, for the bill is only filled out in Virginia, and as the New York firm reserves the right to accept or reject the orders and the money is paid in New York, the transaction is purely a New York affair and Virginia has no right to tax New York. Yet Virginia, as well as other States, claims this right, and has recently raised her tax from \$75 to \$100 in assertion of that right.

"The strongest opposition to the bill, however, comes from Washington, where the tax is \$200. In exceptional cases this tax is collected, but the bulk of the business is done through brokers or 'middlemen,' who reap fortunes, which would go to the District of Columbia if the law were strictly enforced. The merchants of New York and other cities united with the Traders' and Travelers' Union,

and established an agency in this District which was visited during the year by about 700 of their salesmen, who transacted their business through this agency without the payment of any individual tax. Now, 7,000 salesmen visited Washington last year, and if the tax of \$200 had been collected from each of them, the revenue to the District would have been \$1,400,000. The Commissioners of the District state that the revenue from this source was less than \$10,000. What became of the \$1,390,000? The brokers take out licenses for which they pay \$200 each to the city; then they lease, sublet or transfer them to the visiting salesmen in consideration of a commission or percentage upon the sales, or a fixed price for each day's use of such licenses, by which is fostered a system corrupt and scandalous. By this means several hundred salesmen can transact business under a single license.

"Sometimes the salesmen do business passing as members of the firm they represent, and so avoid the tax. During the year only forty-three certificates were sold while 2,400 were leased to men acting as owners. The tax is \$200 and the certificate costs 50 cents. This brokerage system is a good subject for a Congressional investigation. Washington merchants oppose the bill because they think that in some way the bill, if it should become a law, would interfere with the retail trade of Washington. But how can that be so, for the bill is confined to wholesale transactions between a manufacturer or jobber on one hand and a merchant or dealer on the other. It does not come between the retailer and the consumer, and so the manufacturer, commission merchant and jobber and their agents do not compete with the local retail merchants. The tax has been decided illegal by decisions of the Supreme Court, embracing the opinions of Chief Justices Marshall and Waite and Justice Bradley."

No organization has labored more earnestly for the success of the bill than the Travelers' Association. Fortnightly meetings have been held all winter at the Morton House, and at one of the latest meetings President John F. Henry said: "Few people realize the inconveniences and injustices that the drummer is subjected to by this tax, which is a relic of barbarism. In some States the local authorities make it a practice to bleed the drummer. He is told that he is selling without a license, and that the tax is, say, \$50 and the fine \$200.

"'Give me \$25 and 'skip' the town,' says the shark, 'and it will be all right.' We cannot put our firms to the trouble of a lawsuit, so we pay the 'blood' money and 'skip.' The State, of course, never sees any of the money thus collected. In our petition to Congress we claim that the tax is unconstitutional because it prevents and hinders commerce; it is against public policy, because it tends to restrain competition and makes both dealers and consumers pay higher prices for their goods; unjust, as it permits travelers of some States to enjoy privileges not granted by that State to travelers of other States.

"There are 250,000 traveling salesmen in the country, and we can fairly claim to be the great distributors of goods, for out of 400,000,000 tons of goods shipped yearly by the railroads we ship 300,000,000. Our business is clearly, therefore, a most important feature of inter-State commerce, and Congress has a right to legislate in the matter. The objection to the bill is the old State rights cry, but the country has outgrown that and the tax will have to go. We have received assurances from enough members of Congress of their support to look for the passage of the bill by a large majority when it comes before the House."

The Labor Troubles and General Business.



LABOR STRIKES continue to keep the country in a state of excitement and anxiety, breaking out in industries where they were little anticipated and being continued after all hope of success had vanished. The strike on the Southwestern railroads, after lasting over two months, was finally declared "off" by the

Knights of Labor when the railroad had shown its ability to get along without the strikers. The Third Avenue railroad also demonstrated that it was not dependent upon the old force of drivers and conductors, and easily filled their places with new men, but the strikers still held out, refusing to recognize the fact that they were defeated, and, as a consequence, many of them were permanently thrown out of employment. In the coal mining and iron industries, among the shoemakers and hatters, and, in fact, in nearly every line of industry, the workingmen have shown dissatisfaction, and left their employment for one reason or another.

On the first of May an attempt was made to compel employers to recognize eight hours as a day's work at ten hours' pay, and thousands of workingmen struck to obtain this concession. In some lines of industry, notably in the building trades, the employers were forced to grant the demand, having orders that they were forced to fill, but in other lines the demand was refused; indeed, so general was the refusal, the workingmen changed their demand, and instead of insisting upon eight hours, asked simply for shorter hours, which might mean eight, nine or ten, according to the requirements of the various callings. Many of the employers declined to make any concessions whatever, holding that the course pursued by the strikers had so demoralized business that they could not be more liberal than they had been. Some large factories were shut down entirely, the owners declaring that they would not be opened again until the workmen had recovered from the strike epidemic that afflicted the country. Just how successful the eight hour movement may be it is impossible to predict at this writing, but the indications are that it will be successful only to a limited extent and that but temporarily.

The worst phase of the labor troubles was the communistic riots that occurred at Chicago and Milwaukee. In both these cities, communistic agitators took advantage of the strikes to incite riot and pillage, which naturally and necessarily led to bloodshed. The riots made public the fact that in all the large cities there are organizations of reckless, desperate men, who seek to provoke disturbances that they may rob and plunder. They call themselves socialists, anarchists or communists, but under whatever name they are organized, their object is to overthrow law and order, kill the representatives of the law, and, by force, appropriate to themselves the savings of property owners. They deny the right of anyone to accumulate property, and claim that everything should be enjoyed in common. The labor troubles have given them opportunity to teach their doctrines at public assemblies, and a few of the hot-headed strikers have listened to their denunciations of capital, and followed their lead. The great majority of workingmen, however, have hastened to repudiate these robbers and murderers, and to declare that they recognize the fact that capital is as necessary to labor as labor to capital. Nevertheless, the unreasonable demands of the workmen, and their resort to the boycott and other means of intimidation to enforce them, indicate that means approved by them are but little behind those of the anarchists—both defy individual rights and the laws, and the ignoring of the law in one respect paves the way for an open defiance of all laws. When the employees of a railroad say to the managers that they must only employ such persons as they approve, it is but a step short of assuming control of the property, as the anarchists wish to do. The riots in the West, and the loss of life that was their necessary accompaniment, have opened the eyes of many of the strikers who, however willing they might have been to go to extremes to enforce their demands, are not prepared to advocate murder, arson and robbery, which are the weapons the communistic leaders would have them employ.

However the strikes may result at the present time, at best the strikers can only triumph temporarily. Those who concede their demands do so only on compulsion, and as soon as the pressure is withdrawn from them they will retaliate upon the workingmen who have taken advantage of their necessities. These strikes, occurring at a time when a prosperous season was promised and every business man was preparing to take advantage of it, have destroyed all sentiment

that formerly existed between the employers and their employees. Hereafter employers will make such use as they can profitably of the workingmen, but when they get through with them, they will not hesitate to discharge them with as little warning as they gave when they went on strike. It has been the boast of many a manufacturer that he kept his workmen year in and year out whether he really needed them or not, but the selfishness and ingratitude shown by the workingmen this season have absolved employers from all obligations of this nature in the future. In every way that the matter can be looked at the strikers are the losers; they have sacrificed millions of dollars that would have been theirs had they continued work; they have been consuming their savings or running into debt, during their voluntary idleness; but above all, they have intimidated enterprise, so that millions of dollars worth of work that was contemplated has been abandoned because of these troubles, and the lack of confidence capital has in the workingmen. When the strikers determine that they wish to return to work, they will find that there is little work for them to do, and that there will be fifty men seeking every vacancy that occurs. As a consequence, there will be more idle workingmen the coming winter than have ever before been known to be idle. The natural result of an overstocked labor market will be the reduction of wages, and we predict that in most lines of industry wages will be lower next year than they have been known in many years heretofore. The result of these strikes upon general business has been most disastrous, and all business men are complaining of extreme dullness, without any prospect of improvement unless the strikes should cease, and the workingmen make such arrangements with employers as will guarantee a continuance of their services without interruption from the Knights of Labor, or any other organization. Not until workmen are emancipated from the control of associations managed by reckless demagogues and agitators can they claim to be free men, and not until then will capital and labor be thoroughly harmonized.

There were printed in Bradstreet's on May 9 a collection of statistics relative to the eight hour movement which showed that the whole number of workingmen engaged in it was 325,000; the demand was conceded to 150,000 without a strike, and to 35,000 after striking, the remaining 140,000 being still on strike or defeated at the time of that publication.

Jewelers' Board of Trade.



THE NEW YORK Jewelers' Board of Trade is a comparatively young organization as yet, but has already exercised a good influence in the trade, and has given evidence that it is capable of doing far more. When it was established, it was by no means with the unanimous voice of the trade, and it has had to grow numerically at the same time that it was developing its usefulness. It has had to feel its way by degrees and to win confidence by the thoroughness of its work. Its path has not been strewn with roses at all times, but it has encountered obstacles that were unexpected and opposition in places where it had looked for support. Notwithstanding this, it has pursued the even tenor of its way, its managers learning from the experience acquired as they went along, till, at the present time, it enjoys the confidence of all who are familiar with its workings. The Providence Board of Trade has had less to contend with, and its development has been attended with less opposition, so that it has worked smoothly from the first, and is doing most excellent work for the trade. It was surprising that the jewelers delayed so long establishing organizations of this kind; they have existed for many years in other lines of business, and their usefulness and importance have been fully recognized. The chief object of these Boards of Trade is to watch credits, and to keep the members informed as to the standing of those who seek credit for goods—they are, in effect,

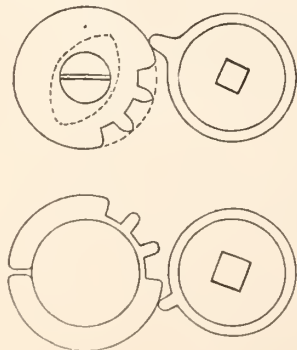
commercial agencies, doing for a special industry what the great private commercial agencies are doing for the general public. No private agency can be expected to be so careful and thorough in prosecuting its inquiries in a special field as will one that is specially occupied in that field and has no other business to look after. The New York Board of Trade has done its work as thoroughly as could have been expected of a young organization, but is laying the foundation for even more thorough work. It is a matter of public notoriety, the courts having passed upon it, that the former Secretary became involved in a difficulty with the publisher of a book of ratings, and that the Board was held responsible to a certain extent. While there was a difference of opinion as to the responsibility of the Secretary, he nevertheless resigned his office and severed all connection with the Board. His successor was recently chosen in the person of Mr. S. H. Condit, for a number of years the Secretary of the Stationers' Board of Trade, one of the most successful and influential trade organizations in the country. His large experience with work of this kind, and his familiarity with all the details of office routine tend to make him a valuable acquisition. All impediments to the further development of the plans of the organizers of the Board having been removed, they propose to go ahead in the future with renewed energy, and to carry out to the fullest extent the ideas with which they started out. What it has already accomplished has demonstrated that it is entitled to the confidence of the trade, and it is to be hoped that its membership will soon include every house of importance in the jewelry business. The more representative it is made the greater power for good it will wield.

The Stopwork.



THE LAST of the accessories of the moving power is the mechanism regulating the amount of tension to apply to the spring in winding it, and the range of development of this latter to be employed for the daily march of the watch, says Mr. Grossmann, in his "Construction of a simple, but mechanically perfect watch." This point, of all others, is the most open to controversy as to the best mode of attaining its purpose. In its execution there is a great variety, from its total omission to the rather complicated but ingenious stopworks of some Swiss and French watches.

When we attempt to establish the relative merits of those different constructions, there is an important feature which may guide our judgment, viz., friction. All stopworks, the parts of which move under control of a frictional resistance, may be objected to, because friction, however slight it may be, is a useless loss of power and should be avoided if possible. Besides, in all the stopworks of this kind, it is a tooth or finger only, which, by butting against the full part of the stop wheel, puts an end to the winding; this tooth or finger is liable to break under the strain it may be subjected to by the careless way in which many people wind their watches.



FIGS. 1 AND 2.

The most common of these frictional stopworks, though not often seen in watches, has a wheel in which only three or four teeth are cut, and all the rest of the periphery left full. This wheel is screwed

with a stop screw to the plate, and the end of the barrel arbor carries a finger or tooth gearing into it, and moving one tooth of it at each revolution of the arbor. At the beginning and end of the winding range, the tooth butts against the full part of the wheel's circumference, and prevents further motion of the arbor in this direction. It is evident that during all the time between two passages of the tooth, the stop wheel is without any control whatever, and might move around its axis by any external shocks if the freedom of its motion was not checked by a stiffening spring, causing sufficient friction. Sometimes the stop wheel is reduced to a narrow rim and is open at the place opposite the teeth, so that it is sprung on a little undercut stud spared from the substance of the barrel cover, thus gaining its hold without any screw or spring.

To the same class belongs a kind of stopwork, forming, as it were, an inward gear. An eccentric annular groove is cut into the barrel cover, a little undercut at its outer edge. This groove holds an annular spring, in the inner edge of which some teeth are cut, in which the stop finger is to gear, and to limit the winding by coming into contact with the plain part of the spring. The friction of the latter in its grooves prevents any untimely movement. It is obvious that this arrangement is liable to the same objections as the former ones.

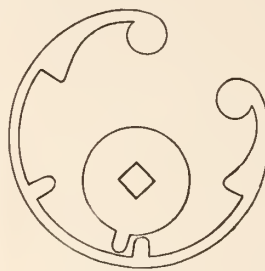


FIG. 3.

Of the other class of stopworks operating without friction, we mention a very judicious arrangement frequently met with in the better class of Swiss and French watches of about fifty years ago. It consists of two small toothed wheels gearing into each other; the one on the barrel arbor having some teeth more than the other, so that the same teeth of both wheels meet only after a certain number of turns allowed for the winding. Both the wheels have on their upper sides, fastened in a solid way, a stop piece of steel, and these two stop pieces, when meeting, stop the motion by butting in a right angle. The mechanical perfection and reliability of this stopwork are beyond doubt; but it has the drawback of requiring an additional height for the stop pieces placed over the two wheels, and it is easy to find that by the same quantity the breadth of the mainspring must be restrained.

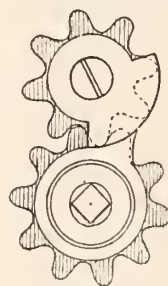


FIG. 4.

The stopwork with the Maltese cross is the most in use for watch work, and deserves this preference. It is too well known to require description. It is true that the careless way in which this stopwork is often executed in the lower grades of watches is a source of trouble and disappointment, both to the wearers of the watches and to the repairers. It must be well understood that the Maltese stopwork does not admit of any neglect in its construction; but if well made it is perfectly safe, and it only requires a judiciously arranged set of tools to manufacture them in an irreproachable manner.

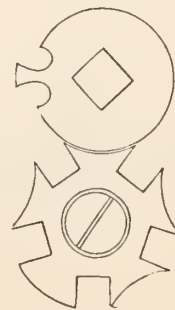


FIG. 5.

Still, the stopwork, however well it is made, is only an unavoidable evil, because it complicates the mechanism, consequently rendering it more liable to disorder and failure; and it takes away part of a place which might otherwise have been devoted to extra breadth in the mainspring. It is, therefore, no wonder that the question has been earnestly considered, whereby it would be possible to dispense entirely with the stopwork, without compromising the solidity or the rate of a watch, and without exposing the mainspring to any disproportionate strain. This question deserves careful study, for the advantages to be derived from the suppression of the stopwork are of considerable importance. Thus it will only be necessary to investigate whether these advantages are not outweighed by some grave inconveniences.

The omission of the stopwork has been tried in a manifold way. It is more than twenty years since a spring was suggested for this purpose, to the outer end of which was riveted a piece of the same spring, of a length equal to about one-third of the inner diameter of the barrel.

This piece was fixed backward in the direction of the spring, and its free end was resting against a hook in the barrel of the ordinary shape. This arrangement allows the spring to be coiled up to its outermost extremity, and the short piece riveted to it will then rest

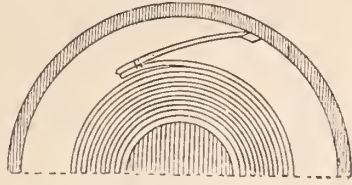


FIG. 6.

in an oblique direction against the hook, and prevent any farther winding (fig. 6).

This system is superior to the simple omission of the stopwork, because it preserves the spring much more against breaking; but it does not protect the other parts of the movement from the sudden strains resulting from inconsiderate winding; a fault, though, which may be urged against any of the kinds of stopwork hitherto referred to.

This arrangement looks rather primitive, but it ought not to be totally rejected. I was desirous of obtaining a correct idea of its merits, and constructed about twenty years ago two small ladies' watches, which had to be very flat, with barrels of this kind. These watches have been kept in constant use by persons in my immediate neighborhood, and thus I have had them under my constant observation all this time; they gave satisfaction as to the rate of going, and none of the springs have been broken up to the present time.

Some years ago I saw some watches of American origin, the barrels of which were arranged in quite a similar way, with the only difference that the piece riveted to the end of the spring had two pivots at its free end, the one of which moved in a hole through the bottom of the barrel, and the other in the same way was held in the barrel cover.

More than ten years ago a system was invented by which the weak points of the one just mentioned are avoided and the stopwork entirely dispensed with. These are the *free springs* of Mr. A. Philipps. An examination of their advantages, and of the objections raised against them, will not be out of place here.

These free springs are made or arranged in such a way as to take their hold in the barrel without the usual hook, merely by the greater tension and strength of their outer coil, which, for this purpose, is about double the thickness of the acting part of the spring. The relative thickness of these two parts must be kept in such proportion that the outer coil, always keeping a frictional hold in the barrel, follows the winding movement, but only when the spring has attained a certain maximum of tension. Thus, any tension of the spring beyond this maximum is rendered impossible, if the winding is continued ever so long.

The springs of this kind have been, and may be, executed in two different ways. According to the one, the thicker part is a part of the spring itself; while the other way consists in adding to a spring of the usual kind a separate piece of greater strength, equaling in length the inner periphery of the barrel, and forming, as it were, an elastic bridle for the mainspring, which is attached to it by a hook.

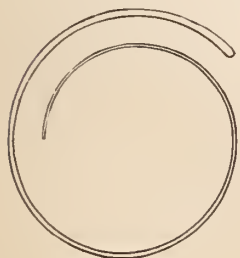


FIG. 7.

The effect of the two dispositions is, of course, the same.

It is not easy to pronounce briefly an opinion for or against the free spring; for, judging equitably its merits, we have to consider its drawbacks and the objections raised against it by watchmakers and

repairers, and balance them against the advantages it promises.— These latter are:

1. Greater height of barrel, allowing to employ for a watch of the same size a broader and thinner mainspring, which is consequently

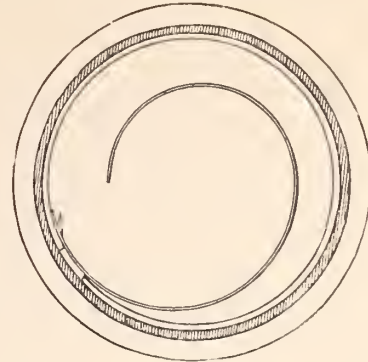


FIG. 8.

less exposed to accidents and gives a more uniform traction. 2. Economy in the manufacturing of the barrel. This advantage is, however, in a degree absorbed by the higher price of the face spring, but this price will be considerably reduced if the face spring should become a regular article of trade. 3. Complete elimination of all derangements of the watch, resulting from defects or disorders of the stopwork. 4. Protection of the movement against all injury arising from inconsiderate and rough winding. 5. Lengthened period of daily march with once winding, because the free springs generally are made so as to admit a tension of six turns or more. These advantages, especially those from 3 to 5, are of great importance, and No. 4 in particular has not yet been so much appreciated as it might be.

The Romance of an Untrustworthy Watch.



EVER SEE anything funny in the course of my business? Certainly I do," said a jeweler to a reporter. "See lots of fun sometimes, and, by the way, your question reminds me of the fellow who was in here half an hour ago. He has a watch—there it hangs now—that is more trouble to him than all his brains, though I don't mean to say that he is a fool. The most foolish thing that I know of him is that he will persist in carrying that watch. Well, as I was about to say, that self-same ticker of his comes to me not less than once a month regularly.

"I remember very well the first time he brought it. It was one Tuesday morning, and as he had known me for some time before that, he stopped to tell me of his troubles. The watch, he said, hung on a nail in his room on Sunday evening, ticking away for dear life. He was very much interested in a book he was reading, so much absorbed, in fact, that though he looked at the watch every two minutes to see if it was time to see his best girl yet, he did not notice that the hands had stopped moving. At last he heard the clock striking, and mechanically counting the strokes found that it was 9 o'clock. The watch only said 7:30, and as it was a case of 8 o'clock or not at all, he tried hard to devote the remainder of the evening to his book, which had suddenly grown uninteresting.

"The next day he shook the timepiece up, got it to going in fine style, called on his lady love in the morning, explained the cause of his failure to keep his appointment, and soothed her sensibilities by arranging to take her to the opera at night. When evening came he made sure that the watch hands were walking around the watch face at the usual rate and again took up his book. Half-past six, seven and half-past seven—it was time to go now. He put the ticker in his pocket, his coat on his back and left the hotel. When he reached — Walnut street he rang the bell, walked in and asked for Miss — with the greatest assurance.

"Gone out? It was impossible.

"But, he was told, she did go at half-past eight with Mr. —. Half-past eight! He was thunderstruck again, but a glance at the clock on the parlor mantel assured him that it was then nearly nine o'clock, and he left in a maze of disappointment. The watch had stopped some time during the day and started again according to its own sweet will, and was an hour or so behind time.

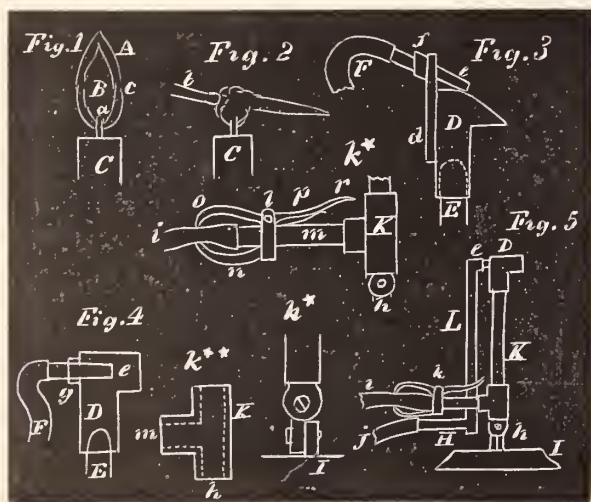
"Since that time he has married another girl, and is not yet on speaking terms with the one that his watch got him left with. Nearly every time he comes, he tells of how he missed an appointment, or a train, or something of the kind, the day before. I have frequently told him that the watch was a cheap affair in the first place, and it is not worth repairs now, as it cannot be made to keep time by the best jeweler in the land, but he always says it will have to do a little longer. Just for the curiosity of the thing I looked over my books the last time he was here to see how much he had paid me for putting it in order, and it was just \$32. I sell a very fair watch for \$30 nowadays."

Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



THE PRINCIPLE on which a blow pipe acts on a flame is exactly reverse to the conditions which attend an ordinary flame, as will be evident on inspection of fig. 1, where is shown an ordinary candle; *A* representing the flame, and *C* the candle. The philosophy of the flame is the heated wick *a* decomposes the tallow into gasses consisting mostly of hydrogen and carbon, which on coming in contact with the air, burns on the outside as shown in fig. 1, where *a* represents the wick, *B* the gaseous emanation, and *C* the true envelope of flame. With the blow pipe the effects are two-fold; the flame burning on the outside and inside both, producing a greater



heat but less illumining power. It has also the advantage that we can manage and control the flame very much to our liking, which is a great consideration for mechanical purposes. To resume the description of our self-acting blow pipe: I will first describe an arrangement which will enable us to use our mouths to work the blow pipe, and still have both hands free to hold and manage our work. But I would warn the reader that we do not get as much heat by using air which has passed through the lungs, and that the device is no way as desirable as the one worked by a bellows. Still as a make-shift it does very well for light work, like spectacles, and can be applied to any gas burner. It consists of an ordinary elbow or L burner such as we use for soldering; to this we attach a blow pipe so arranged that we can adjust it to produce such a flame as we desire. The general plan of the arrangement is shown in fig. 3, where *D* represents the elbow burner attached to the gas jet *E*. What we desire to do now,

is to put the blow pipe *c* in such a relation to the elbow burner *D*, that if we keep a steady and constant blast through it, we will get a steady and constant flame. In order to accomplish this we had solder to the elbow burner *D* a support *d* for the blow pipe *c*. This support *d* has a sort of socket or sleeve *f* attached, through which the blow pipe *c* can be slid back and forth until in the proper position to produce the desired flame; then it is well to secure *c* to *d*. A small rubber tube *F* attached to *c* extends to the mouth of the operator; this tube should only be long enough to be convenient, as an excess of tube is an annoyance. The end to which the mouth is applied should have a mouth piece of some kind fitted to it, as the rubber tube itself is not desirable. A small piece of reed does very well. This device (fig. 3) answers well for attaching to the automatic blower described in last article. A better form of elbow burner for the automatic blower and also for the mouth is shown in fig. 4. In this the elbow burner is not cut away oblique as in fig. 3; and the blow pipe *c* enters the tube *D* as shown at *g* (fig. 4). The form shown in fig. 4 goes on the gas jet precisely as fig. 3. At fig. 5 is shown a hand stand. It consists of a base *I*, which can be made of cast iron or wood loaded with lead. Attached to the base *I* is a double joint *h*. This joint is shown separate at *h** and is simply a double joint as shown, capable of being moved in any direction. The piece *K*, fig. 5, is a piece of $\frac{3}{8}$ gas pipe; the lower end plugged so as to make it gas tight. The top is an elbow burner as shown in fig. 4. The air is supplied by another $\frac{3}{8}$ gas pipe *L*, arranged as shown. The top of *L* is attached to the blow pipe, and the lower end is bent, or an elbow attached to which the rubber tube *j* from the blower is fastened. The action is simple enough, the tubes *K* *L* run up side by side as shown, *K* supplying the gas and *L* the air; the blow pipe part is arranged as shown in fig. 4. The rubber tube *i* leads to the gas jet. The advantage of this device is, it can be set on the bench at any angle, or held in the hand, and the flame directed to any object which we wish to heat. By using a rather light flexible tube for the gas supply a device called a pinch cock can be applied to regulate the flow of gas. The usual way is to turn on gas enough as we would suppose for the work, and then by the management of the air pressure get the amount and kind of flame we desire. At any rate if a person has such a mechanical blow pipe he will soon learn to manage it. The situation is this: you can by regulating the flow of gas and managing the air pressure with the foot, without any change in the blow pipe shown in fig. 4, get a tiny fine shaped jet of flame or a broad scattered one. The pinch cock spoken of above is shown at *k*, fig. 5, and also enlarged at diagram *k**. The tube *K*, fig. 5, has another tube extending out at right angles as shown, to which the rubber tube *i* is attached, and is shown in diagram *k** at *m*. This tube *m* can be attached to *K* by means of a T elbow. Such gas appliances are all understood by the gas fitters; but for the benefit of those not supposed to be such I will describe it more particularly. A T joint or elbow is shown separately at *k***; it is in this case a tube of malleable iron with $\frac{3}{8}$ holes running through it, as shown at the dotted lines. These holes are tapped out to admit the threaded ends of the pipes *K* and *m* into them; also the jointed support *h*, fig. 5. This jointed piece *h* also serves as a plug to close the lower end of *K*. In getting up such a blowpipe, the tube *K* should be about 5 inches long and *m* 2 inches. The best way is to get a gas fitter to cut off the short pieces of tube and thread them for you. The top of *K* will need no fitting except to file it slightly taper to fit the elbow *D*. The pinch cock spoken of above is in principle a pair of jaws which clasp the rubber tube *i*, effectually closing it. The details are shown in diagram *k**. Surrounding the tube *m* is a clip *l*; to this is attached a jaw *n* extending forward, so at any time it slightly press up under the tube *i*. The upper jaw *o* is jointed to *l*, and is provided with a spring at *p* to close *o* down firmly on *i*. If we want the gas to flow we press on the lever *o* at *r*, and the gas flows through *i* proportionately to the extent we raise *o*. Such a pinch cock can be applied to both gas and air tubes, but if attached to the gas it will be found sufficient. The writer made a

digression from the subject of repairing spectacles to take up the mechanical blowpipe just described, and he feels justified in the course, for such a blowpipe is not only useful for spectacle repairing, but for many other jobs on a jeweler's bench where both hands are required.

[Reprinted from the Mineral Statistics of the United States for 1883-1884. Edited by Mr. Albert Williams, Jr. Published by the Geological Survey.]

Precious Stones.

BY GEORGE F. KUNZ.

Continued from page 115.

Allanite.—The allanite found in large masses and crystals in Amherst county, Virginia, is very compact and bright black in color, and would form a black metallic gem stone.

Sodalite, cancrinite.—At Litchfield and South Litchfield, Maine, sodalite, elæolite and cancrinite are found in boulders in size from that of the fist to those weighing many tons. They lie scattered over the surface for the distance of about 4 miles. One mile and a half west of this line, across a pond in West Gardiner, these minerals are found associated with zircon, as in South Litchfield. On some of the West Gardiner farms there are ledges of rocks that are evidently the source of these boulders. The boulders occur principally on the farms of Moses True, Capt. Joseph Wharff and Rufus Smith.

The deep-blue and azure-blue sodalite and cancrinite, a rich yellow, and occasionally in hexagonal crystals, occur sparingly in seams in this tough elæolite and lepidomelane rock. The seams are from 1 millimeter to very nearly 1 inch in thickness; some of the white seams found are evidently altered sodalite; the cancrinite has been found 2 inches thick.

Violet and azure-blue sodalite have been found associated with elæolite, biotite and zircon in a syenite vein at Salem, Massachusetts. Enough has been found within the last two years at South Litchfield to give it some gem importance. A number of distinct hexagonal crystals of fine waxy yellow cancrinite, as a rule embedded in the deep-blue sodalite, have also been found; also pink and greenish masses, and masses of rich yellow, 2 inches in thickness, which could be used the same as sodalite.

Scapolite.—The pink and purplish scapolite found at Boston, Massachusetts, will polish nicely and form a neat ornamental gem stone.

Lazulite.—Lazulite in dark-blue crystals and crystalline masses is found at Crowder's and Chubb's mountains in Gaston county, North Carolina, and at Coffee Gap, Sauratown mountains, Stokes county. At Graves mountain, Lincoln county, are found the finest sky and dark-blue crystals known. This mineral would make an opaque gem or ornamental stone, as the color, although lighter, is often as rich as lapis-lazuli.

Cobaltite is occasionally cut abroad, and resembles a flesh-colored pyrite when cut. It is not found of fair quality at any American locality.

*Zincite, franklinite and willemite,** as found intermixed in the zinc mines at Franklin, New Jersey, are at times ground into charms and paperweights, and ornaments of different kinds, principally by the miners. They do not admit of a very fine polish, however, though they present a good appearance. A curious brown serpentine containing zinc, described by Prof. C. U. Shepard, was also cut and polished by the miners here.

Enstatite and bronzite.—Enstatite and bronzite are found half a mile west of Texas, Pennsylvania, and in beautiful massive foliated varieties. Bronzite was observed by Dr. Genth† near Crump's serpentine quarry, near Media, in Middletown township, and also near Henry Hipple's, in Marple township, forming the mass of Castle

rock; also in Newton township near the lime kiln, and near Radnor's Delaware county. Bronzite and enstatite occur in large quantities at Bare Hills, Maryland.

Titanite.—At Bridgewater station, Delaware county, Pennsylvania, some remarkably fine crystals of titanite have been found. Some of them, over 1 inch long and very transparent in parts, are a rich greenish yellow and a vitreous golden, equaling in color the finest from the Tyrol, and some would afford gems weighing from 10 to 20 karats each, that would show a play of colors rather adamantine than opalescent. Some of the fine crystals from this locality are now in the cabinet of Mr. C. S. Bement, the W. S. Vaux cabinet, Academy of Natural Sciences, Philadelphia, and in the Peabody museum, New Haven.

Many yellow crystals‡ over 1 inch long have been found in the hornblende gneiss on the Schuylkill near Philadelphia, and yellow crystals with sunstone at W. Cloud's farm and Pearce's paper mill, in Kennett township, Chester county, Pennsylvania.

Chlorastrolite.—One of the largest known perfect chlorastrolites is in the cabinet of Mr. M. T. Lynde, of Brooklyn, Long Island, a gem measuring 1½ by 1⅞ inches. A fine pair of chlorastrolites over half an inch across are in the possession of Mr. F. A. Canfield.

Datolite.—The compact, opaque, white, creamy and flesh-colored varieties of datolite found at the Minnesota, Quincy, Marquette, Ashbed and other mines in the copper region of Lake Superior, admit of a very high polish, and make an excellent opaque gem or ornamental stone. Notably one especially fine nodule over 4 inches across, with a flesh-colored center shading off into gray and creamy tints, was found at the Delaware mine, and is in the cabinet of Mr. C. S. Bement.

Thompsonite.—Large quantities of thompsonite have been cut into gem stones during the last year, the cutting consisting almost entirely of a rounding off of the pebble so as to show the concentric and other markings to the best perfection. Some of them, over an inch in diameter, have been polished. As a rule, the small ones are the finest material. The lintonite is really a variety of the thompsonite and polishes very nicely, either alone or when occurring with the flesh-colored forms of thompsonite.

Natrolite.—Many veins of natrolite, and more particularly one large surface, representing over 300 square feet of the mineral, were met with at shaft No. 2 of the West Shore railroad, at Weehawken, New Jersey. Although this quantity afforded millions of crystals, scarcely any were stout enough to afford gems of this beautiful limpid and white mineral so abundantly found here and all along Bergen hill where any tunneling has been carried on.

Fine crystals are found in the Lake Superior copper region. None has been sold for gems in the United States, though it is occasionally used as an initial gem for the letter "N" in initial jewelry.

Pectolite.—Among the Eskimo implements collected by the United States Signal Service at Point Barrow, Alaska, and examined by Prof. F. W. Clarke§ was a supposed jade, which he found on analysis to be a new and interesting variety of compact light-green pectolite; specific gravity, 2.873. This was obtained from some point east of Point Barrow, on the Kowak river, and forms an interesting and unexpected addition to this line of gem stones.

Apophyllite (also called fish-eye stone) is really too soft for gem purposes, though repeated references are made to it by gem writers.

The Erie tunnel, Bergen hill, afforded thousands of fine doubly-terminated detached crystals, less than one-fourth inch in diameter, that were really beautiful as ornaments; this same tunnel afforded a single crystal 4 inches in diameter. Some beautiful ones have also been found at the Cliff mine and other localities in the Lake Superior copper region, at times being perfect specimens of limpidity. The West Shore railroad tunnel at Weehawken, New Jersey, was the first locality in the United States to produce pink and flesh-colored crystals. Many beautiful ones were found here, though not as fine as

* See also "Mineral Resources of the United States," 1882, page 496.

† "Preliminary report on the Mineralogy of Pennsylvania," page 63.

‡ *Ibid.*, page 27.

§ *American Journal of Science*, III., Vol. XXXVIII., page 63.

the Andreasberg or the Mexican varieties. This and the Lake Superior locality would both afford material for cutting.

Apatite.—Apatite was found in such remarkably perfect and fine-colored crystals at the tourmaline locality at Auburn, Maine, by Mr. N. H. Perry, that the hill on which the tourmalines were found has been named Mount Apatite. These crystals were transparent green, pink and violet, and so much resembled tourmaline as at times to have been mistaken for it. Some of the local collectors attempted cutting some of them, but the hardness is too low for a transparent gem.

Crocidolite.—Crocidolite was observed by Col. Joseph Wilcox in long, delicate fibers of a blue color, in one of the western counties of North Carolina.

Mr. Theo. D. Rand found a dark-bluish fibrous mineral at the Falls of the Schuylkill, and Prof. W. T. Roepper found at Coopersburg, associated with white and brownish-white garnet, bluish-white crystalline fibrous coatings, which may belong here.

Crocidolite was also observed near Cumberland, Rhode Island, and at Eland Fountain, Orange river, New Jersey, though none of gem value has yet been found in the United States.

Serpentine.—The many fine varieties of serpentine found in the United States would admit of use in some cases as ornaments. The dark-green noble serpentine of Newburyport, Massachusetts, was cut into oak and other leaf-like forms, very effectively indeed, by Mr. F. Osgood, of that place. The handsome yellow serpentine of Montville is also of the precious variety.

The beautiful varieties of serpentine or verd antique from Harford county, Maryland, admit of a fine polish.

The serpentines of Saint Lawrence county, as also those of Cornwall, Monroe and Warwick townships, Orange county, the ophiolite of New York city and vicinity, the serpentine of New Rochelle, New York, also some of the Hoboken, New Jersey, and the Staten Island varieties are useful for ornamental and occasionally for gem purposes.

At Stoneham, Maine, green and red damourite,* altered from topaz, was cut into different odd forms and charms by local collectors. At Deer Isle, also, serpentine of a very light-green color occurs.

The serpentine of Texas, Mineral Hill, Newtown, Marple, Middletown and other localities in Delaware county, Pennsylvania, are also very fine.

The serpentine from the neighborhood of Patterson†, Caldwell county, North Carolina, is of a dark greenish-black color, and admits of a fine polish.

The serpentinous substance named pelhamine by Prof. C. U. Shepard‡ admits of a very good polish and with a very curious effect.

Dr. F. A. Genth mentions as being found at Easton, Pennsylvania, a bowenite frequently containing a small quantity of tremolite; it is of a greenish and reddish-white color and of great tenacity. This is evidently the so-called jade mentioned in the report for 1882. The easy working of this material and the effective designs that can be made from it, recommend it as having fully as much merit for tourists' jewelry as the various teeth, beans and other like things that are sold for this purpose.

Fluorite.—The clear varieties of colored transparent fluorite are designated as false ruby, emerald, sapphire, topaz, amethyst, etc. Many fine specimens of the green have been found at Muscalonge lake, Saint Lawrence county, New York, at times crystals over 1 foot across.

The Hardin county, Illinois, localities are the largest deposits in the United States, and some thousands of tons are annually mined here; crystals of the richest purple, yellow, red, rose-colored, green

and other varieties are very common. It differs from the English in that the crystalline faces in nearly all cases are dull and the colors show only by transmitted light. Some crystals 1 foot across were observed here.

On the Cumberland river, Tennessee, some of the finest American crystals of a blue-green variety have been found: wine and honey-yellow ones also at Saint Louis, Missouri, in the geodes in the limestone. Fine crystals are found at Pike's peak, Colorado.

One of the most remarkable varieties of this mineral is a chlorophane from the microlite localities§ at Amelia Court House, Virginia. This fluoresces by the heat of the hand, and when a cut stone was placed in a vial of warm water, showed distinctly in a dark room, thus making a new form of gem, *i. e.*, a fluorescent gem stone, though not hard enough for any kind of wear.

Fossil coral.—The Iowa fossil corals have during the last year been sold more largely than heretofore for jewelry, paper weights and specimens. One Philadelphia lapidary states that he sold over \$250 worth in one year. It is sold to some extent at Iowa City and other places in Iowa, as well as at the regular tourists' stopping places all over the United States.

Lepidolite.—Lepidolite has been found in large quantities in the past at Mount Mica, Paris, Maine, which has afforded masses of 50 pounds of very fine color; at Hebron and Norway, and more recently at Auburn, also at Mount Black, Rumford, Maine. As this mineral is used to some extent abroad for ornaments, such as dishes, vases, paper weights, etc., the similar utilization of the American material is suggested.

Aragonite and satin spar.—The aragonite "satin spar," from near Dubuque, Iowa, especially in such fine form as at Rice's cave, and in such remarkably fine forms as the "floss ferri" variety, from near Rapid City, Dakota, would admit of the same uses as common satin spar.

The satin spar (gypsum) ornaments, such as beads, eggs and a variety of others sold at Niagara Falls and many of the tourist places, are almost without exception imported from Wales, though some few common white gypsum ornaments are at times cut from gypsum found near Niagara. On Goat Island large masses are often found, and occasionally even under the falls, where all the material for all the ornaments sold here is supposed to have been found. Fine selenite occurs here, but no satin spar.

Malachite.—One very fine, compact, fibrous mass of dark green malachite, that would cut a beautiful cube 1 inch square, from the McCulloch mine, Virginia, is in the cabinet of Mr. C. S. Bement.

Hoffmann mentions it in massive concretions in Copper cañon, Galena district, and at Mineral Hill, Nevada. Some of the copper mines of Arizona and New Mexico will undoubtedly furnish fine specimens when they are more developed.

Mr. F. E. Monteverde has some gem specimens of malachite of very good quality, over 1 inch across, from the Copper Queen mine, Bisbee, Arizona. Malachite has been found recently at the Globe and Arizona mines in fibrous and mammillary masses, and in seams from 3 to 4 inches in thickness and of very fine color, in many respects equaling the finest from Russia. A number of fancy articles have been made from it. At Ducktown, Tennessee, some fine radiated masses have been found that would polish well.

(To be Continued.)

The Gold Fields of Bouré.



THE FOLLOWING report of Consul Lewis at Sierra Leone on the gold fields of Bouré is published by the State Department: The intelligence from the interior which I gather from the native travelers and traders is that one of the chief objects of the French in invading the country east and southeast from Senegal is to take

§ *American Journal of Science*, July, 1884.

¶ "Minerals and Mineral Localities of North Carolina," 1881, page 41.

¶ "Preliminary report on the Mineralogy of Pennsylvania," page 10.

* *American Journal of Science*, May, 1885.

† Genth and Kerr's "Minerals of North Carolina," page 57.

‡ "Contributions to Mineralogy," 1876.

possession of Segou, on the Niger, the large city visited and described by Mungo Park, and of the country of Bouré. It is said that at Segou the royal treasures, chiefly of gold, are very valuable.

The natives say that there is a small house in the city well guarded, "full of gold," which has been accumulated by successive chiefs by means of conquests and tributes for the last hundred and fifty years. The French, it is alleged, wish to take possession of this house, and is it any wonder that every effort possible would be put forth to prevent it?

The other point for which it is thought they are making is Bouré, which is the richest gold region in West Central Africa. The city of Bouré is the chief place of the country bearing the same name. No white man has been permitted to visit it. Major Laing tried in 1825, and Caille, the French traveler, soon after, but they failed. Winwood Reade, in 1869, reached Didi, a town on the southern confines of the country. He went from Sierra Leone through Falaba, of whose capture and destruction I informed the department in July last.

Late last year, or the early part of this year, a detachment of French troops is said to have entered Bouré. They were, however, soon driven out by Samadies troops, suffering severe loss.

From the natives, of whom I have made careful inquiry, I gather the following:

Bouré is situated about 450 miles northeast from Sierra Leone, on the headwaters of the Niger. It is a hilly region, containing numerous gold mines. The gold is now dug on the plains in the neighborhood of the town. The hills are said to be full of the precious metal, but they remain hitherto untouched. No native with whom I have conversed on the subject seems to have any idea of the extent of these auriferous deposits. I am told that whenever the houses or yards are swept the dirt is carefully saved and washed, and they always find some particles of gold.

Their method of mining is very simple. After the earth is dug up the women are employed in washing it in calabashes; the small particles of gold are deposited at the bottom of the calabashes, and collected with great care.

The gold that is intended to be sent away and sold is taken in the dust to the blacksmith and melted, and artistically formed into twisted rings, when it is ready for sale.

It is said that gold dust is the only currency used at Bouré, and it is the only country in the interior of Africa where gold is so used, being kept and carried about in quills.

All the traders are provided with small scales made in the country, and which are remarkably accurate. The seeds of a tree are used for weights. A piece of gold of the weight of one seed is worth 25 cents, or four seeds to the dollar, and you never find any person with a piece of gold for sale who does not know just its value.

There is a constant and active trade kept up between Bouré and the other interior countries and the coast.

They have shops well stocked with European goods, carried to them by the Mandingo traders, consisting of guns, powder, calico, amber, coral, beads, cotton goods, and some hardware.

I asked my informant whether any spirits could be bought in Bouré. He replied in the negative. He said it was not known there, and no one ever thought of it; that no spirits could pass beyond Falaba.

The population of Bouré is said to be about 3,000. It was formerly a pagan country, but within the last few years it has been reduced to Islam by Samadu.

They now have schools and books, and the people are learning Arabic. Bouré is considered a sort of forbidden ground to foreigners, and rather than allow the French to occupy it the whole country would to a man turn out to expel them.

With so much at stake the people, under such a leader as Samadu, are prepared, no doubt, to offer successful resistance to almost any invader.

If we can believe all we hear from the most direct sources there

is no region in the world which is richer in gold than Bouré. The soil, according to description, seems made up of it. The introduction of civilization, with its improved methods, would give to this whole country wonderful importance and make it the center of civilization for the whole of Soudan.

I believe all the gold which is sold from Liberia to Senegal comes from this town, Bouré, and it amounts to a great many thousands of dollars in the course of a year.

Should these lines ever come to the eyes of the outside world I would caution any who have the spirit of adventure and can almost see gold within their grasp not to waste their substance in securing passage to this country, as the time has not yet arrived to enable them to secure substantial profits. I notice in some of the American papers that there is some apprehension or misapprehension as to the intentions of Samadu with respect to Christian settlements on the coast. His designs, as far as I can learn, are the most friendly. He will interfere neither with Christian settlements nor Christian missions. He is at war with the French only, who are invaders of his country, and he does not attack even their colonies, which he might easily do, for they are comparatively defenseless—such colonies as Mellacourie, Rio Nunez, and Rio Pongas. His war against the French is chiefly defensive. He is aggressive against marauders and plunderers who interfere with the freedom and safety of the roads. He is, I believe, anxious to open the way for a regular and direct intercourse with the coast.

JUDSON A. LEWIS, *Consul*.

UNITED STATES CONSULATE,

Sierra Leone, November 2, 1885.

Diseases of the Eye and How to Adjust Lenses.

ASTIGMATISM.

Astigmatism is due to a deformity of the globe in which one curve of the cornea is sharper than another. If the vertical curve is sharper than normal while the horizontal curve is normal the rays of light in the vertical meridian will be brought to a focus earlier than rays in the horizontal curve, consequently if such an eye observes a pin hole in a card board which is placed in the window, the hole will be magnified in its vertical diameter, thus appearing vertically oval, this condition is called myopic astigmatism. Where one meridian is too flat and the other normal it is a hyperopic astigmatism. All meridians may be curved too sharp but not equally *sharp*, this is compound myopic astigmatism, all meridians may have an abnormally flat curve but be curved unequally, this is compound hyperopic astigmatism. One meridian may be curved too sharp while the other is abnormally flat, this is mixed astigmatism. The majority of persons have a slight astigmatism, so long as it is below $\frac{1}{8}$ it seldom interferes decidedly with vision. Cases where the correction of $\frac{1}{8}$ has *greatly* improved vision have undoubtedly a much higher degree of astigmatism than has been corrected.

If a person sees badly and you have failed to find any satisfactory spherical glass ask him to look at the radiating lines in table No. 2. If he says some lines are blacker than others you may be sure he is astigmatic and will require a cylindrical glass, cut to order, for his special case.

If the vertical curve is the sharp one, the horizontal line will be magnified, consequently is the black one, so long as the magnification is not so great as to make the line indistinct; when this point is reached the vertical line will retain its former size while all the horizontal lines will look blurred and indistinct.

The horizontal curve being flattened all lines in the vertical meridian are made indistinct, while the horizontal line remains black because it has not been made indistinct, but its breadth is not magnified. Before *ordering* a glass for astigmatism it is necessary to have the patient obtain a written prescription or order from an expert, showing how the glass must be ground. It is never advis-

able to trust the ordering of such a glass to any but an experienced person. There is no visual defect where the disturbance of vision bears so unconstant a relation to the amount of the defect as in astigmatism. Astigmatic persons usually see badly at a distance, and print blurs badly when they read, usually the glasses which correct the defect produce a decided improvement in the vision. Sometimes the vision is brought to the normal standard like magic, other times the improvement although marked is not satisfactory, other times the correction of the defect does not appear to improve the vision any. The brain undoubtedly becomes accustomed to the distorted form of the retinal image so that its proper correction or return to its true proportions is not agreeable. Astigmatism where one half of the rays in a given meridian are refracted more than the other half, is usually due to inequalities in the crystalline lens, it cannot be corrected and is called irregular astigmatism. It does not vanish upon immersing the eye in water as do other forms of astigmatism due to faulty corneal curves.

Were it not for this defect, which is present to a greater or less extent in every eye, most of us would be able to see the moons of Jupiter without a telescope.

Astigmatism is usually readily detected with the ophthalmoscope, when it amounts to $\frac{1}{3}$ or more it is easily detected, and under FAVORABLE circumstances $\frac{1}{6}$ may sometimes be detected. The common way of detecting and correcting it is to try the patient with the CONVEX cylindrical glasses, (axis vertical and rotate right and left to horizontal,) if none are found which improve vision, the concave cylindrical glasses are tried in the same manner. Where both curves of cornea are faulty, one meridian may be corrected by a simple spherical glass, the difference in the meridians being supplied by a cylindrical glass. Two convex cylindrical glasses may be required with their axes at right angles, a convex cylindrical may be required in one meridian while a concave cylindrical is required in the other.

The axes of the glasses should be carefully noted, when the best vision has been obtained, the patient should be given time in complicated cases to practically try the glasses by reading half an hour, for mistakes are quite expensive to the one prescribing the glasses. The glass or combination of glasses with which the best vision can be obtained is the required glass. It is only to be obtained by practically trying the glasses.

A cylindrical glass being the *only* glass with which no harm can be done to the eye of the patient, there is no objection to giving a glass which the patient finds improves his vision, but unless one has had long experience, I would always insist upon the patient obtaining a written order from some reliable oculist before furnishing the glasses. The mistake is sometimes made of trying cylindrical glasses before it is fully decided whether spherical glasses improve the vision, persons having myopia $\frac{1}{2}$ will see better with a concave 20 cylindrical glass than without, as they are then corrected in one meridian, which is better than not being corrected in any meridian, but much worse than when corrected in all meridians by a simple concave glass.

A FEW PRACTICAL HINTS ON INFLAMMATORY AFFECTIONS.

First.—If a person comes to you complaining of *pain* in his eyes with DILATED pupils, ask him if he don't see rings around the lamp? He probably will say he does. If so, you assure him that unless he give prompt attention to his eyes he will *certainly* lose his sight. *Don't give* him any glasses although he says he sees better with them. He has "*glaucoma*."

Second.—If you see a child that begins to squint and you cannot cure it immediately with glasses, you are doing the parent a favor when you assure him that the child will lose the sight of the squinting eye unless he attends to it.

Third.—If a person says everything looks smoky, "I see better when I first get up but soon everything looks smoky," he probably has acute inflammation of the *choroid*. If he places himself in the hands of some intelligent ophthalmic surgeon he will probably make a rapid recovery, if not he stands a good chance of losing his sight.

Fourth.—Floating specks in the eye may or may not be of any great significance.

Fifth.—A complaint of fixed black specks usually indicates beginning cataract, which, when ripe, can be removed. The success of the operation always depends largely upon the delicateness with which it is performed; clumsy operators have horrible results, while no surgical operation is so successful as cataract, when carefully performed.

Sixth.—A red eye, where, when the under lid is pulled away from the globe the redness appears more intense upon the eye ball than upon the lid, the iris (when the felloweye is covered with the hand) is sluggish in its movements or does not move at all, and when compared with the normal eye is of a hazy dull color and devoid of the natural clearness of the normal iris, is a dangerous eye, such an iris will stick fast to the lens and do much mischief in a short space of time.

Seventh.—Ingrowing eyelashes and granular lids destroy sight by scratching the cornea, which finally becomes white, "*pannus*."

Eighth.—Ulcers on the cornea destroy eyes by perforating and having the iris become fast in the wound, this frequently forms a source of irritation for years. By being awake to a few of these most important facts one is able frequently to give his patient most valuable advice.

[This chapter is taken from a book published by the Spencer Optical Manufacturing Co., of New York, titled "Detection and Correction of Visual Imperfections."—ED.]

Wisconsin Retail Jewelers' Protective Association.



THE FOLLOWING report of the proceedings of the sixth annual meeting of the Wisconsin Retail Jewelers' Protective Association, held at Watertown, Wis., May 5th, 1886, is furnished us by one of the members who was in attendance.

A portion of the retail jewelers of Wisconsin met at Watertown the 5th inst., and though small in numbers, displayed a great degree of interest in the proceedings.

The meeting was well presided over by Second Vice-President W. D. Sproesser, of Watertown, who showed considerable executive ability, and is an officer and member the association may well be proud of.

The Secretary read many letters received from retail jewelers residing in different parts of the State, all tending to show that there is a great desire on their part to have the association continue, the writers regretting their inability to be present, but stating that they would abide by the action of those present in all matters adopted for the good of the trade in general.

The report of the Secretary showed a continued increase of membership, though several former members had withdrawn or gone out of business.

The Treasurer's report showed a balance still in the treasury after all claims were settled, including the dues to the U. S. Guild.

The members voted \$25.09 to the Secretary, not in settlement for services rendered, but rather as an indication of their appreciation, hoping the time might come when there would be funds enough to remunerate him liberally. They also tendered him a vote of thanks for the efforts he had made to get the trade interested in harmoniously working together to correct the abuses from which the jewelry trade has so long suffered.

No action has ever been taken towards erasing from the books of the association the names of members in arrears for dues, as it was hoped that such members might be interested in handling Guild stamped goods, consequently might be induced to square up rather than be cut off from their sale, it being one of the rules that members cannot have the sale of such goods if in arrears, so it was resolved

to allow such members one more year in which to come to the front, after which their names will be dropped unless they toe the mark, and their right to sell Guild goods will be revoked.

Some years ago the State Legislature undertook to regulate the auction business, and passed a bill granting licenses for one year for one hundred dollars, good in any part of the State, thus giving auctions a better show than they ever had before. To remedy this great evil, it was resolved to petition the Legislature to repeal this law at its next session, and substitute one granting incorporated towns and cities the right to regulate such matters in their own way, and the Secretary was instructed to have a partition drawn up to that effect, and a copy mailed to every retail jeweler in the State, with a request to have it circulated for the signatures of the business men of their respective localities.

The Secretary stated that in receiving complaints from retailers in different parts of the State, against jobbers for retailing goods to consumers and outside dealers at wholesale prices, nearly all were against those jobbers who issue illustrated catalogues.

It was therefore resolved that all illustrated catalogues as issued by jobbers should be considered an unmitigated evil, and the association protested against their continuance, and recommending that all retailers refuse to patronize such jobbers till they cease to publish them.

The association retains their old officers for the coming year, viz.:— C. A. Estberg, Waukesha, President ; C. Learned, Fort Atkinson, 1st Vice-President ; W. D. Sproesser, Watertown, 2d Vice-President ; W. H. Thorp, Beaver Dam, Secretary and Treasurer ; C. B. Tousley, Fort Atkinson, G. Scherzinger, Fond du Lac, A. Wiggenhorn, Watertown, Executive Committee.

Milwaukee was selected as the next place of meeting in May, 1887, or at some other date as the Executive Committee might deem more convenient or advantageous.

Gossip of the Month.

THE early-closing-on-Saturday movement, which was generally adopted by the jewelry trade last summer, was so satisfactory that it is to be repeated this summer. Beginning with June, and extending through July and August, all places of business will be closed at one o'clock on Saturdays, thus giving all employees a half holiday. This enables them to take a run into the country or to the seaside to spend Sunday, and reap the benefit of a full day of relaxation. Last year nearly all the railroads leading out of the city arranged their time tables so as to accommodate the crowds that wanted to get away between one and two o'clock, and we presume they will do the same thing this year. The CIRCULAR takes considerable credit to itself for having inaugurated this movement last year, gentlemen connected with the paper having secured large numbers of signatures to an agreement to close their places on Saturday afternoons. The arrangement worked so satisfactorily that the trade readily accepted the cards furnished by us this year, announcing that "This store will be closed at one o'clock P. M. Saturdays, during the months of June, July and August.

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A JEWELER at Decatur, Illinois, was recently arrested charged with having fraudulently sold a watch to a customer. The allegation set forth that he sold a \$45 Howard movement for \$75 by representing that it was an adjusted movement ; also that he had caused the word "adjusted" to be engraved on the movement after it left the manufacturer, and represented that it was adjusted to position, heat and cold. The purchaser had his suspicions aroused, and he wrote to the Howard Company, giving the number of the watch and asking if

it was an adjusted movement. Receiving a reply that it was not but was one of their cheaper grades, he caused the arrest of the dealer who was held to answer the charge. We have not heard the outcome of the case, but the statement as published in the local papers is substantially as we have stated. The watch companies have enough to contend with in legitimate competition without having their goods falsified and their reputations injured by such swindling transactions. It was reported that there were other similar cases against the same dealer, and if he is proved guilty he ought to receive the full penalty the law provides for obtaining money by false pretences.

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THE *Horological Journal* of London, makes a timely appeal for an international standard of weight for diamonds. The value of the karat varies in different countries, being 3.17 grains Troy in England, 3.0 grains in Holland, 3.18 in France, and 3.2 grains in the United States. To add to the confusion, a fourth part of a karat is called a grain, although less than a grain Troy weight. This is sometimes qualified by calling it a "pearl grain," but the distinction is more frequently left to the imagination than definitely explained. The makers of scales for weighing diamonds use two values, the English and Dutch, which differ 17 grains. The term karat, derived from the name of the little hard red seed of the coral flower of Abyssinia, used for ages among Eastern nations as a weight for precious metals and stones, has become so universally adopted that it would be impracticable to change the designation, but it is not only feasible but desirable that an international standard of value should be given to it. It must puzzle some of our large diamond buyers, who spend so much time abroad looking for precious stones for this market, to keep the run of the varying value of the goods in which they invest so much. As Americans are now regarded as the greatest consumers of diamonds, they should take a leading part in the endeavor to secure a standard of value for the karat that would be recognized by all nations.

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AN attractive feature of the Colonial and Indian Exhibition, recently opened with imposing ceremonies by the Queen of Great Britain, is a fac-simile of an African diamond mine, set up and operated by the Cape government. The entire process of diamond mining is exhibited, from the washing of the earth to the marketing of the gems. In connection with this exhibit, the process of setting diamonds is also shown. There is always so much popular curiosity regarding precious stones, that this constitutes one of the best advertisements the Cape government could possibly have devised.

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IT IS remarkable how old prejudices and superstitions cling to precious stones even in the present days of enlightenment. We know a lady of refinement and culture whose husband presented her with a very beautiful opal pin a few years ago ; her friends warned her that it was unlucky, but she laughed at them, and claimed that she was superior to such superstitions. Later her husband dropped considerable money in Wall street speculations, became engaged in some costly litigation, and met with a variety of reverses that swept away the greater part of a competency. The wife immediately threw the blame upon the opal, and her croaking friends all exclaimed "I told you so." Finally she sent the stone to a friend to sell for her, and before he could find a purchaser, he failed, and now the stone is held responsible for his "bad luck." This confirmed the lady in her determination to get rid of her opal, but she found the superstition

against it so wide spread that she finally made a large sacrifice in order to do it. Just what effect the opal had on the price of wheat, causing her husband to lose his money, the lady does not explain, or how the friend who tried to sell it for her escaped bad debts or bankruptcy, is a mystery she does not attempt to solve. And yet this lady is a sincere Christian, and believes that an all-wise Providence directs all things, and does not hold life and property dependent upon the possession of a little stone.

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APRIL and May were distinguished for a remarkable series of wind and rain storms, extending into almost every section of the country. On April 14 a tornado swept over the towns of St. Cloud and Sank Rapids in Minnesota, destroying some forty lives and two million dollars worth of property; it ravaged the country for many miles in the vicinity, destroying everything in its path. In May there was a series of similar disasters in Missouri, Illinois, Indiana, and Ohio, some of the wind storms extending into portions of Pennsylvania and Virginia. The Atlantic sea-board and the Southern States had less wind, but prolonged periods of rain causing heavy floods in many of the rivers and small streams. It would seem from the printed accounts that this was an exceptionally stormy and wet season, and that the loss of property in consequence was greater than usual; but comparison shows that there occur annually disasters of various kinds to about the same extent; if not by tornadoes and floods, then by epidemic or conflagrations. It seems to be ordained that a certain percentage of the population and property shall be destroyed each year by disasters that cannot be provided against; as the population increases in number and property in value, the number killed and the amount destroyed is larger each year, but the percentage remains about the same. Persons claiming to be weather wise, predict prolonged droughts for the summer as a result of the excessive rainfall of the spring months. All these disasters have a bad effect upon trade, for in some instances entire communities are impoverished, and their neighbors who are called upon to aid them are also made poor. Still, a season of good crops restores the equilibrium, and while individuals still feel their losses, the communities recover, and go on with their business as though there had been neither tornadoes nor floods. In this progressive age men cannot afford to sit down and brood over their losses; they must buckle on their armor and renew the fight or they will be crushed under the wheels of progress entirely.

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CONGRESS has taken no definite action as yet upon any of the measures in which trade and commerce are so vitally interested. The bankruptcy bill is dead for the session, the silver bill has been defeated, and no measure intended for the special benefit of business men is likely to receive favorable consideration. Congress busies itself quarreling with the President over the distribution of patronage, or discussing measures of a purely political significance, or in dividing up the spoils under the head of appropriations. The majority of bills introduced are devised for the express purpose of taking money out of the treasury, and instead of fostering and encouraging industry and enterprise among the people, Congress is persistently adding to the taxation of property, and burdening trade and commerce with new restrictions. It may well be asked "what does our national legislature contribute towards our national prosperity?" It would be better for business of all kinds if Congress met but once in four years, and its sessions were limited to making appropriations for running the Government for the next four years.

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THE latest reports regarding the labor troubles indicate that the

strikers have been defeated so uniformly, and are returning to work so generally, that business men are feeling greatly encouraged, and indulge hopes of a fall trade that will be so great as to compensate, in a measure, for the dullness of the spring trade, in consequence of the strikes. There is a general sentiment that there is yet time to redeem the business of the year, provided only that employers can have confidence in their employees restored. This may be the case with established industries, but in all trades connected with building operations, capital has been so intimidated that building has been to a great extent suspended, and millions of dollars that would have been expended this year in this line of industry have been diverted into other channels. If, however, business in other lines resumed its normal condition, there will be, as a natural result, an improvement in the jewelry business; we find some manufacturers who are confident that the worst has passed, and that there will be a steady improvement in business from this time forward, and that the holiday trade may be confidently expected to be large.

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THERE are indications of a degree of dissatisfaction among the more prominent labor organizations that may result ultimately in the dissolution of the Knights of Labor. This organization, it is claimed, has sought to destroy all labor unions in the various trades and the members of these are jealous of their right to control matters they regard as peculiarly their own, and assert that the Knights, in assuming to dictate terms to all trades, has, in the vernacular of the West, "bitten off more than it can chew." The fact that its officers were utterly unable to control the members in the more important strikes that occurred, seems to demonstrate that the organization has undertaken altogether too much, and that its boasted strength is in reality its greatest weakness. Employers generally do not oppose the organization of trade unions that are controlled within the trade, but when an organization attempts to array all trades in hostility to one, and to dictate terms to that one, as was recently done, employers must, as a measure of self-protection, array themselves against it. It has transpired that the men who ordered the strikes in the sugar refineries of Brooklyn never worked in a refinery in their lives, and knew nothing practically about the business, yet the workmen obeyed their orders to strike, without having a grievance, solely to compel the employers to recognize the authority of the men at the head of the local assembly of the Knights of Labor. If such a condition is to be tolerated, we shall expect to see the shoemakers of Lynn ordering the jewelers of Providence, Attleboro and Newark to strike in order to force the employers of Lynn to recognize the Knights of Labor. This would be no more absurd than were the Western railroad strikes, or that of the conductors and drivers on the Third avenue line in this city. The arbitrary dictation of the Knights has made the leaders of the unions restless and dissatisfied, and a contest between them is promised that will, it is to be hoped, result in the dissolution of the Knights, for neither employer nor employee is safe a moment when subjected to the dictation of an order that has proved itself so reckless and inefficient. Should this come about, enterprise and capital will feel encouraged, and the prosperity that just escaped us this year may come to us next season.

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SEVERAL of our correspondents have condemned in toto the practice of jobbers issuing catalogues, illustrated or otherwise, and now comes the Wisconsin Retail Dealers' Association and by resolution also condemns all catalogues, but especially those that are illustrated. It is asserted that it is by means of these catalogues that goods fall into the hands of outsiders, and especially induce con-

sumers to ignore the retail dealer and send direct to the jobber for whatever they may want. The publishers of catalogues do not print a price list in connection with them as a rule, but hold that separately sending it only to regular dealers. It is claimed that this regulation is not observed with religious scrupulosity, but that if a person is tempted by the catalogue he has but to write to the jobber to get the trade price list that goes with it; with this in his possession he is in just as good condition to send an order as the dealer, and in most cases it will be filled with the same degree of promptness. It seems rather hard to condemn catalogues in such a sweeping manner, for manufacturers and jobbers have regarded illustrated catalogues as one of the very best methods of advertising that could be adopted, and also as the best method, next to showing the goods themselves, of letting the dealers know what new goods were being manufactured. Thousands of dollars have been spent annually in making drawings and cuts of attractive goods, and in printing these in the highest style of the typographic art; we have seen some catalogues that were as fine examples of printing and binding as this country ever turned out, really works of art, and worthy of being preserved as such. But now the dealers say these costly catalogues are a nuisance, and they threaten to boycott any jobber who sends them out. It does not seem to us that the objection lies so much against the catalogue as it does against the price list; if the one could be circulated and the other religiously kept for the use of the trade, there could little harm come from the catalogue. But the temptation to send a price list to any one who takes the trouble to write for it is stronger than principle with some men, and so it is probable that the distribution of catalogues has led to price lists falling into improper hands. If catalogues have led to abuses we are sure that their publication has been conceived in good faith as a rule, and the publishers of them thought they were conferring a benefit upon the dealers, in giving them something from which customers could make selections. Of course they were advertising their own goods, but they could have accomplished all that was necessary in this direction without going to the expense of printing an elaborate catalogue which they thought would be for the dealer an excellent substitute for a sample case. There are many manufacturers and jobbers who have kept faith with the dealers, and while publishing catalogues, have abstained from sending out price lists except to applicants who could establish their identity as regular dealers. A catalogue without a price list is certainly a harmless thing, but if their publication leads to abuses and injury to the retail dealers, it will probably be discontinued, or hedged about with such restrictions and safeguards as will prevent the abuses in future.

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WE HAVE tried to impress upon the trade the benefit to be gained by dealers in general, by causing to be reprinted in their local papers extracts from the fashion articles printed in our columns from month to month. It is of no benefit to us in any degree, for all we desire in connection with them is to secure their widest publicity, that those who have money to spend may know the styles that are in vogue. We furnish proof slips of these articles several days in advance of the publication of THE CIRCULAR, in order that editors may use them while they are fresh and newsy. The greater the number of dealers who send for them the better we shall be pleased. Among those who have recently requested to be supplied with them regularly, and who promise to "put them where they will do the most good," are the following dealers:

J. S. Niswander, Gilroy, Cal.; L. E. Hodges, Madison, Fla.; Geo. Metzger, Jr., Emporium, Pa.; John B. Smyth, Renovo, Pa.; J. S. Barnaby, cor. Washington and Grove streets, Vicksburg, Miss.; Palmer, Batchelder & Co., 146 Tremont street, Boston, Mass.; J. J. Sweeney, Houston, Texas; Miss A. E. Connor, 39 Park Place, City, care American Press Association; Geo. F. Kunz, care Tiffany & Co., Union Square, City; A. M. Hull, New Orleans, La.; Henry Rowlands, Albany, N. Y.; M. S. Smith & Co., Detroit, Mich.; Geo. C. Ridgway, Mansfield,

Ohio; W. L. Hopkins, Havana, N. Y.; Stilson & Rounds, Anniston, Ala.; Geo. McL. Presson, Farmington, Me.; H. Niehaus, 1304 Franklin avenue, St. Louis, Mo.; J. Wetherell & Son, Parkersburg, W. Va.; G. W. Ludwig, Chambersburg, Pa.; J. W. Grubb, Wheeling, W. Va.; P. H. Lachicotte & Co., Columbia, S. C.; Myers & Finch, St. Paul, Minn.; Bunde & Upmerer, Milwaukee, Wis.; Buker & Skinner, Rockford, Ills.; C. F. Adam, Alexandria, Va.; Benj. J. Mayo, 887 Broad street, Newark, N. J.; Geo. H. Ford, New Haven, Conn.; W. A. Latta, Camden, S. C.; E. H. Ayres, Elmira, N. Y.; H. D. Calkins, Dunkirk, N. Y.

The Jewelers' Security Alliance.

President, DAVID C. DODD, JR.

First Vice-President, AUGUSTUS K. SLOAN.....Of Carter, Sloan & Co.
 Second Vice-President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
 Third Vice-President, DAVID UNTERMAYER.....Of Keller & Untermeyer.
 Treasurer, W. C. KIMBALL.....Of H. F. Barrows & Co.
 Secretary, C. C. CHAMPENOIS.....Of Champenois & Co.

EXECUTIVE COMMITTEE.

J. B. BOWDEN, *Chairman*.....Of J. B. Bowden & Co.
 C. G. ALFORD.....Of C. G. Alford & Co.
 GEO. W. PARKS.....With E. I. Franklin & Co.
 F. KROEBER.....Of F. Kroeber.
 N. H. WHITE.....Of N. H. White.
 CHAS. G. LEWIS.....Of Randel, Baremore & Billings.

EXAMINING FINANCE COMMITTEE.

GEO. H. HODENPYL.....Of Hodenpyl & Sons.
 CHAS. F. WOOD.....Of Chas. F. Wood.
Counsel, HON. ALGERNON S. SULLIVAN.

For further information, Application Blanks for Membership, By-Laws, etc., Address P. O. Box 3277. 170 Broadway, New York.

The third annual meeting of the Jewelers' Security Alliance was held at 170 Broadway, on May 4, 1886.

The meeting was called to order by President Dodd. The minutes of the last annual meeting were read, and the reports of the Treasurer and Auditing Committee received and accepted.

The report of the Executive Committee was rendered as follows.

REPORT OF THE EXECUTIVE COMMITTEE.

NEW YORK, May 4, 1886.

Three years have elapsed since the Jewelers' Security Alliance was organized in the special interest of the retail jeweler.

The Alliance was called into being to prevent the frequent burglaries of jewelers' safes. That it has done a splendid work is a fact beyond question, and while it has not received the support which it merits, its growth has been steady and its benefits to the trade far-reaching.

It is a source of great gratification to the officers to say that not a single member has been disturbed during these years, although there have been quite a number of jewelers robbed during the same period.

The fact that the Alliance exists has, without doubt, been of advantage to others in the trade besides our own members, as its equipment for thorough, systematic and effective work is well known to the professional burglars who seek the jewelers as their victims; but that the trade may feel secure from the depredations of these dangerous men, we again earnestly urge dealers to join the Alliance, for with our certificate conspicuously displayed near your safes, you can rely upon having the best attainable protection.

Our funds are sufficiently ample, and our facilities better than ever before, to render valuable assistance to our members should occasion require.

While the cost of membership is very low, we believe that in the near future our numerical and financial strength will be such that we can safely do away with the five dollars annual dues. A largely increased membership is almost certain to bring about this result.

We now have a net membership of 515, and, with a little effort on the part of each member, we should double this number during the coming year.

The work entrusted to the officers and Executive Committee has been faithfully looked after during the year. Your Executive Committee has held 13 regular and special meetings, devoting sufficient time to give all matters necessary and proper consideration.

On June 9, 1885, Mr. E. F. Dorrance resigned from the Executive Committee, and Mr. Geo. W. Parks was elected in his place.

In closing our report we know of no more pertinent question than we asked a year ago—who in the trade can afford to be without a certificate in the Jewelers' Security Alliance?

Respectfully submitted,

C. G. ALFORD, *Chairman.*

The election of officers resulted in the choice of David C. Dodd, Jr., for President; Messrs. A. K. Sloan, Henry Hayes and David Untermeyer, respectively, for 1st, 2d and 3d Vice-Presidents; W. C. Kimball, Treasurer; C. C. Champenois, Secretary; and Messrs. J. B. Bowden, Geo. W. Parks and F. Kroeber as members of the Executive Committee for a term of two years each.

Messrs. Chas. F. Wood and Geo. H. Hodenpyl were appointed on the Examining Finance Committee.

A committee was then appointed to escort President Dodd to the Chair, and the following is a brief summary of his address to the members:

PRESIDENT'S ADDRESS.

Gentlemen—I thank you for this renewed expression of your confidence. We are now to enter upon the fourth year of our work, and I think I voice the sentiment of every member of the Executive Committee, and of those of the members who have examined the condition and workings of the organization, when I say that we have passed the point where our work can be considered an experiment; we think we stand on solid ground, financially, and have demonstrated the advantages to be derived from membership.

To be able to display a certificate of membership of the Jewelers' Security Alliance has so far, at least, been to possess a safeguard and warning which no burglar fails to recognize, and we here renew the public notice that no quarter will be given in any case should the safe of any member of this organization be robbed.

Gentlemen of the Executive Committee have given freely of their time during the year to promote this work. If that man is a benefactor of his race who can make two blades of grass grow where but one grew before, surely he is entitled to some recognition who can give additional security to property already in possession.

I know that men are slow to believe that time and thought are given in these days without compensation in some form, and therefore I feel justified in repeating the statement made already—that no officer or member of this organization receives or expects remuneration of any kind for services rendered. We ask only that the trade shall help on the work, and all the compensation we expect is complete and thorough success in our efforts.

Again thanking you for your confidence, I can only pledge an earnest effort, so far as I may be able, to promote the success of the Jewelers' Security Alliance.

On motion it was carried, that a vote of thanks be tendered to the trade journals for the interest they have shown in the Alliance, and for their kindness in publishing notices of its proceedings.

Also, that a sincere and hearty vote of thanks be presented to the officers and Executive Committee for the interest they have taken in the affairs of this Alliance, and the faithfulness with which they have carried them out.

The meeting then adjourned.

Vision.

[BY DR. C. A. BUCKLIN, NEW YORK.]



CAN plainly see by my daily interview with practical opticians that they regard the subject of practical optics applied to the correction of visual defects by lenses as shrouded in mysterious complications too difficult for the ordinary mind to grasp. This is a great mistake; the simplest piece of mechanism connected with watch

repairing is very much more difficult to understand. A man need not think if he thinks his head too thick to think he need only to follow a prescribed routine to arrive at all the necessary results required.

The first experiment to be gone through with, if a person presents, whose case is in any degree complicated, is to determine immediately how much he can see.

This fact can only be determined by directing his attention to letters at a distance of known size. The distance should be twenty feet and the usual objects are the graduated block test letters. Experiment has already determined what the average healthy human eye can see in the distance.

If it is found that each eye can see perfectly what an eye *should* see, it is at once demonstrated that the party is neither near-sighted nor decidedly astigmatic. Should he complain of his eyes, there remains only three possibilities which could in any way be remedied by the use of lenses. He may be "far-sighted," presbyopic ("old-sighted"), or have weak power to accommodate for near objects. If the use of convex lenses obscure distant vision, the acute distant vision being normal, the person probably has normal eyes and only requires the lenses usually required at his age.

If the distant vision is normal and convex lenses improve print at twelve inches, give to an aged man the weakest lenses with which he can read comfortably.

About seventy per cent. of those who apply to the optician for relief are of this class.

If upon trying the distant letters, convex lenses either improve distant vision or do not make it less distinct, far-sight exists, and the *strongest* convex lens which can be placed before the eye without making distant vision less distinct measures with tolerable correctness the degree of far-sight.

The very strongest convex lens through which distant vision is still good will be the lens young people having weak vision will require. This number will quite frequently reach as high as No. 12 convex.

In people over forty who can see at a distance through No. 12, you simply make the same addition to the No. 12 to compensate for their age that you would make for their age if they had normal eyes.

It is a very prevalent idea among opticians that No. 10 at the age of forty will ruin each and every eye, when, in reality, the man is wearing no stronger correction for his age than the individual who has normal eyes and wears convex 60 to compensate for his age.

Remember you are making no correction for age until you have reached the strongest convex lens which in no way impairs distant vision. Thus the man of forty sees well at a distance through 12; now men of forty frequently require convex 60 to read through, consequently should this individual require $\frac{1}{12} + \frac{1}{60} = \frac{1}{10}$, convex 10, to read with comfortably, you need have no fear about his wearing glasses that are too strong. Having by testing distant vision and experimenting with convex lenses either excluded far-sight or determined its existence and measured its degree *and* also having decided upon the question of old-sight by these simple experiments, we are in position to consider the other possibilities of the case.

Not being able to see the required distant letters the individual is near-sighted, astigmatic, or has diseased eyes.

This pre-supposes that excessive far-sight has been eliminated by the experiment with convex lenses.

If simple near-sight exist the letters can be brought out plainly with concave lenses, the weakest concave lenses which bring the letters out distinctly without giving them the appearance of being too small will be the concave lens required for distant vision.

Concave glasses which are sometimes required to enable one to see given work at a required distance, can only be determined by practically experimenting with concave lenses at the required distance; always go weak on concave lenses or they will be unpleasant.

Cases will be frequently encountered where no lenses will produce

satisfactory vision, others will be moderately improved by concave or convex lenses, but no combination of lenses will improve the imperfect vision, which was obtained through a simple concave or convex lens.

Other cases are encountered where the improvement which is only moderate, is increased like magic by placing a simple cylindrical lens before the lens already in use.

If it is possible for you to obtain these results with additional cylindrical correction, you will have indications of its possibility by directing the attention to the radiating lines which are found in connection with the tests for distant vision; if some one of the lines of the fan is much darker than the others, you may in this case expect increased benefit from the correction of the astigmatism. When the vertical line of the fan at a distance of ten or more feet appears to be the darkest, you will usually require a concave cylinder with its axis at right angles to the dark vertical line.

When the horizontal line of the fan appears darker than the others, a convex cylindrical lens with its axis vertical will usually be required. Occasionally when the distant vision is decidedly imperfect, and neither concave or convex lenses improve it, cylindrical lenses alone will improve the vision like magic. Cylindrical lenses which improve distant vision in any persons under forty, will also answer for reading glasses.

Those wearing concave cylinders, will require convex lenses added as their ages reach forty, or may have simple convex cylinders with their axis set at right angles to the axis of the concave cylinder they had formerly worn.

When the advanced age makes a magnifying glass of stronger power than the refracting axis of the cylindrical lens, then it is absolutely necessary that convex lenses be added to cylindrical lenses, as increasing the strength of the cylinders would make vision worse.

Rule First.—Test distant vision; try convex lenses first, next try concave lenses, if neither improve distant vision, reject the concave lenses entirely and retain the convex lenses only when required to correct for age.

If improvement, result from use of concave or convex lenses, is satisfactory, you have gone far enough; if it is only partial, retain the lens which gives the greatest improvement, and strive to perfect it by the addition of cylindrical lenses.

Having experimented with convex and concave lenses without any improvement, try *convex* cylinders, commencing with the axis vertical, and slowly rotate them before the eyes to determine which portion of the axis produces the clearest vision. Not being successful in obtaining distinct distant vision with convex cylinders, next try concave cylinders. If none of these experiments bring about a satisfactory improvement of vision, make up your mind that there is something about the eye which a glass will not correct.

Annual Meeting of the United States Jewelers' Guild.



THE EIGHTH annual session of the Watchmakers' and Jewelers' Guild of the United States was held at the Matteson House, Chicago, May 12 and 13. President W. N. Boynton, Manchester, Ia., in the chair, H. E. Fox, Emporia, Kas., Secretary. In accordance with the By-Laws the session was confined to members of the Guild.

After an opening address by the President, the Secretary presented his report, which commenced by referring to the visit which President Boynton and Mr. O. Startzman had paid to the East in accordance with the decision of last year's session at St. Louis, that the Guild stamp should be placed on a full line of rolled plate and solid gold jewelry, chains, rings, etc. The eastern trip of the committee is reported to have resulted in a full line of "Guild" stamped goods in gents' and ladies' vest chains, guard chains, neck chains, lace pins,

cuff and collar buttons, solid gold rings, etc., being placed in the hands of all members desiring to handle them. It is mentioned that 242 new members have joined the Guild during the year and that the total membership at the present time is about 1,000. It is recommended that more distributing centers be formed.

Messrs. Wallace, Parsons and Dorr were appointed a committee on applications for membership.

After full discussion and consideration it was resolved that the Guild incorporate under the laws of the State of Kansas.

The following resolution was unanimously adopted:

Whereas, We believe that active and underhanded efforts are being made to capture and control our stamp by certain parties whose interests are directly antagonistic to the success of the Guild.

Resolved, That in our judgment it would not be wise to have the Guild stamp deeded to the association at this time, and that it can be more safely guarded and kept under the control of the members of the Guild, by having it in the custody of the President and a special committee to be called the Committee of Counsel.

Resolved, That the President be required to furnish to the Executive Committee of this Guild a good and legal bond for one thousand dollars, binding himself to do all in his power to maintain the quality of the goods upon which he allows the Guild stamp to be placed, and that goods so stamped shall be furnished only to members of this association; and further, that he will make no contracts allowing the stamp to be placed upon any line of goods without the advice and consent of a majority of the Committee of Counsel; and provided further that this arrangement with the President shall be made for three years, and that the Committee of Counsel shall be elected for three years from this date.

A resolution was also adopted providing that in future the regular sessions should be held every three years instead of annually as heretofore; that the executive officers and the Committee of Counsel shall meet on the second Wednesday of May each year for the transaction of business; and that the President and Executive Committee shall have power to fill all vacancies that may occur by reason of death or other causes.

The Treasurer's report showed that the receipts for the year had been \$571.75, and the expenditures \$441.15, which leaves a balance of \$130.60 on hand.

In accordance with the resolution providing for a triennial session, the following were elected officers for three years:

President, W. N. Boynton, Manchester, Ia.; First Vice-President, Gen. S. M. Bailey, Uniontown, Pa.; Second Vice-President, F. H. Huntley, Cadillac, Mich.; Secretary and Treasurer, H. E. Fox, Emporia, Kas. Executive Committee—B. M. Dorr, Galva, Del.; S. C. Sisson, Covington, O.; J. R. Parsons, La Porte, Ind. Committee of Counsel—O. Startzman, Iowa City, Ia.; J. S. Kelly, Abilene, Kas.; R. S. Mershon, Zanesville, O.

A resolution was adopted tendering to the National Association of Watch Movement and Case Manufacturers the Guild's appreciation of their decision to cut off all jobbers who sell to any outside the legitimate jewelry trade at wholesale prices.

Article 2 of the By-Laws was amended, and will now read as follows:

"We recognize the practical or professional jeweler who makes that calling his leading business as the only legitimate customer of the jewelry jobber, and the only person eligible to membership in this association."

The By-Laws were further amended to permit the President to call the Executive Committee or the Committee of Counsel together at any time of his own accord, or by consent of two members of the Executive Committee.

On motion, it was ordered that the name of the association, as it appears in the incorporation papers, be changed to read the "United States Jewelers' Guild," which will conform with the stamp.

say there are two kinds, solar and sidereal, and they differ from each other in length.

The interval of time we call a second is reduced from the solar day, which is the time between two successive returns of the sun to the same meridian, and this interval divided into 86,400 parts. These solar days are not *equal*, but are made so by the daily equation of time added to or subtracted from the *apparent* solar day.

The sidereal day is the interval between two successive returns of a fixed star to the same meridian, and is 3 minutes, 56.5 seconds shorter than the solar day, and this day divided into hours, minutes and seconds furnishes us with the sidereal seconds. The sidereal day represents the time of the rotation of the earth on its axis, and is the most accurate observation of time that can be made, as it requires no equation, and has not changed as much as one-hundredth part of a second in over two thousand years. Astronomers use astronomical clocks reading 24 hours on the dial, with pendulums vibrating sidereal seconds, and by this time only do they find and locate celestial bodies.

ATTRACTION OF GRAVITATION.

Another law governing the pendulum is this: The action of gravity or the mutual attraction between bodies varies with their masses, and inversely as the square of their distances. Following from this, a pendulum will vibrate seconds only in a given place. Our standard of measurement is taken from a pendulum vibrating seconds in a vacuum at the level of the sea. It also follows that the further a pendulum is removed from the center of the earth the less it will be attracted in its descent toward the vertical. This explains why a pendulum loses on being transferred from the sea level to the mountain, or from one of the earth's poles toward the equator, as the earth is a spheroid slightly flattened at the poles.

A very interesting experiment can be made to show the influence of mutual attraction between masses. Take two well-regulated astronomical clocks with second pendulums, place them side by side, and cause each pendulum to oscillate simultaneously on the same side of the vertical, the pendulums will oscillate to the right together, and to the left for a time together, then they will change so as to oscillate in opposite directions and will never depart from this motion. Another reason why a pendulum loses on being transferred to the equator, lies in the fact that the rotation of the earth gives rise to centrifugal force at its surface. This, being zero at the poles, gradually increases to a maximum at the equator; and, as it acts in opposition to the force of gravity, it counteracts a gradually increasing proportion of this force which shows in the time of oscillation. The rotation of the earth on its axis also has another effect upon the oscillation of the pendulum as you have just seen by the demonstration of the pendulum of Foucault by Prof. Kellicott. The error caused by the tendency of the pendulum to oscillate in one given plane is reduced to a minimum by the use of short arcs of oscillation, and is of very little importance in comparison with other errors.

(To be Continued.)

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

THE long list of weddings that began with Easter-tide and opened the spring season so alluringly, together with the certainty of a quick succession of weddings in June, have kept both jewelers and silver-smiths on the alert with orders for presents, and occasioned the introduction of a number of novelties in several directions. As one's wedding, in the usual course of events, occurs but once in a lifetime,

purse strings are naturally loosened in a more reckless manner than for any other occasion.

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THE groom is expected to make the bride a gift of jewelry or silver—usually the former—that will be conspicuous for its intrinsic worth as well as for its beauty. The two families, when circumstances permit, are in fashion bound to supply all useful things such as table silver and plate, and when harmonious, consult together to insure a complete furnishing without duplicates. A rule often observed is for one family to present the tea service complete, while the other contributes a prolific supply of all sorts and kinds of spoons, forks and odd pieces.

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FRIENDS and acquaintances of a bride are supposed to ignore any suggestion of utility or domestic economy in their presents, but bend every energy to the selection of purely decorative articles. These are oftentimes duplicated, but when there occurs an embarrassment of riches in one direction, the house that furnished the articles receives back the duplicates and supplies their places with other things not already included on the list of presents. Every first-class New York house will do this, provided the articles to be exchanged are returned within thirty days after the date of purchase.

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A FAVORITE present from the groom to the bride is a jeweled brooch or lace pin, and, when money is no object, a pair of ear rings or bracelet, or both, are added. At a recent wedding in this city the bride wore diamonds, a gift of the groom, valued at \$10,000. A necklace and pendant is another favorite present. Sometimes a watch becomes the gift, and occasionally a ring. Whatever the form of the gift, if gems are in it, these are supposed to represent the ladies' preference, whether it be rubies, sapphires, diamonds or pearls.

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SILVER wedding presents in cases have had a great run, for the cases, being designed with reference to the special character of the contents, greatly enhance the appearance of the articles, however elegant these may be in themselves. There are great chests of solid mahogany, olive and other polished woods, lined with satin or plush, and containing in sundry drawers and trays an entire collection of table silver, beginning with tea spoons and running through a diversified catalogue, including lazy tongs, melon knives and forks, marrow scoops, macaroni servers, jelly knives, toddy spoons, sardine forks, medicine and moustache spoons, cream ladles, ice tongs and ice cream knives and the like.

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THERE are numberless small cases containing a single set, pair or piece of silver. Some of these cases, by the by, when first opened by the happy pair, create confusion and no slight differences of opinion as to the purposes for which the enclosed articles were originally designed. More than one bride has puzzled her brain this season to know just what disposition to make of the new asparagus and grape tongs. Recent aspirants for favor in this line are certainly deserving of mention, because, while everybody may not appreciate the necessity (?) that called them into existence, they add yet another interesting curiosity to the already bewildering collection of indi-

vidual pieces just now in so much demand. The tongs in question are about three inches in length, and terminate in two thimble-like receptacles into which the thumb and forefinger are thrust when the wearer daintily lifts between these silver-tipped fingers a piece of asparagus and conveys it to the mouth. These same tongs are also supposed to be admirable assistants in eating grapes. THE CIRCULAR permits its readers to form their own conclusions regarding the comfort to be gained by the employment of these luxuries.

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THE New York houses that make a specialty of wedding and presentation articles in attractive cases provide these in their leading patterns, and have the cases made to harmonize with these designs. The "Indian," "Medici," "Fontainbleau" and other well known spoon patterns run through all the table silver of the manufacturers who originated them. To prevent monotony where an entire collection is selected, as in the case of a complete chest of silver, a separate design of every pattern is provided for each class of spoons and forks, so that while none are absolutely alike, all are recognized as being of the same pattern.

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AMONG the more recent patterns that have attracted deserved attention in the decoration of spoons and forks is the "Nuremberg," in which is represented the quaint costumes of the German peasant, burgher and noble in the age of Nuremberg's greatest glory. In this work, the artist, instead of giving to each class a distinctive figure, gives to each one of the different dozens a form of its own, increasing the number of designs as required to one hundred and fifty. The cases are produced with reference to the pattern, and bear beautifully embossed designs suggestive of the arms of Nuremberg, or the quaint devices of the metal workers of that old city.

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AS HAS already been intimated, the fashions that govern the weddings in Vanity Fair forbids the making of presents of jewelry or useful articles to the bride by any others than the groom, the two families or very intimate friends. All others seek for novelties that will awaken interest because of their newness, and delight because of their decorative effects. It is to supply this latter demand that the world in general is indebted for the long and varied list of odd pieces in silver one sees in pairs or sets in elegant cases, and usually classed among "wedding presents in cases." Under this head come all these pretty luxuries, which have to be placarded to prevent embarrassment arising from lack of penetration on the part of patrons as to the correct mission of said pretty trifles.

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IT MAY be wise in this connection to mention some of the convenient luxuries that appeal at once to everybody who can afford them. In this category come the broad tined asparagus forks and the flat asparagus shovels, any of which assist in properly and gracefully serving a somewhat troublesome dish. Other conveniences are berry scoops and sugar sifters, little wicker baskets of silver for lump sugar, combination olive spoons and forks, and grape scissors with which to clip apart a large bunch of fruit. Very pretty and very convenient, too, are the silver nutmeg graters out in a variety of designs. One simulates the nutmeg as it originally appears in nature,

and on being opened in half, discloses a grater on one side and a receptacle for a nutmeg on the other.

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BUT wedding guests by no means confine their presents to unique articles in table ware; far from it; they patronize freely articles of luxury for the toilet, and this leads to the mention of the beautiful dressing cases of leather or polished wood, that contain all the paraphernalia pertaining to the toilet for either sex. Then there are any number of furnishings for writing desks and bric-a-brac for everywhere.

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COSTLY trifles, such as gold bon-bon boxes, set with real gems, afford a present that is sure to be welcome. One seen simulated a block of wood in which was imbedded two or three rubies and diamonds. Then there are purses of gold net into which is wrought a monogram. But why continue the list. One has but to walk through an enterprising retail jeweler's establishment to understand the attractiveness of a diversified stock, a stock that not only carries the costly elegances, but the inexpensive pretty trifles which attract and hold patrons who otherwise would haunt the china and fancy stores when they have occasion to make a present.

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AS AMULETS and talismens are always more or less patronized by engaged people and others anticipating marriage, this appears a proper connection in which to make mention of the newest sensation in this line, namely the Campanello Margueritta Bell. This tiny bell, first seen in New York City swinging from the watch chain of the young English actor, Kyrle Bellew, and first heard tinkling in a muffled tone at each movement made by pretty devotees of "Wallack's" Theatre, has at last appeared from out its shrouded mystery and been adopted as a talisman charm by many young men and women in society. The original Campanello bell, so the story goes, was found in an ancient ruin in Rome, and, as the hieroglyphics cut therein when deciphered by learned searchers after the unknown signified no end of prosperity to the possessor, it was presented to the Princess Margueritta of Italy, who accepted it as her talisman. The patronage of this beautiful princess was sufficient to warrant duplicate Campanello bells to be made and worn in both the old world and the new. The correct style of wearing this silver tongued symbol, Mrs. Grundy says, is attached to the garter of unengaged young ladies, who proclaim their freedom from matrimonial ties by making music wherever they go, until such time as a betrothal ring is offered and accepted, when the little bell is transferred from its seclusion to ever after tinkle on the chain of the happy victor. Jewelers will tell their patrons, and with truth, that this little bell is now made in both gold and silver, and is worn by young people as a charm, sometimes on the chain and sometimes on a bracelet or a lace pin.

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WHILE on the subject of charms it may be well to add that the Oudja has appeared in a variety of forms. A pleasing one is that of a silver lace pin simulating a wish bone from the center of which hung an Oudja.

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A DECIDED novelty in silver jewelry are the Coolie sets, consisting of a collar, bracelet and ear rings, veritable copies of ornaments worn

by the natives, from which fact they take their name. The Coolie collars are in outline something like a horse shoe, but only about one-fourth of an inch in thickness each way. The open space is barely wide enough to admit of the collar being thrust on the neck sideways, after which it is turned and adjusted so as to bring the open part at the back of the neck, the collar clasping the throat very snugly at the front and sides. The main portion of the collar is chased, while the curved end terminates with a sort of flat knob or ball. The bracelets are similar in shape, style and decoration, the only difference being that these open with a spring or hinge in the center to facilitate the putting on and off of the ornament. The ear rings are simply a third and smaller edition of the same pattern as the collar and bracelet, and present the appearance of barbaric hoops when adjusted to the ears. Authorities on such matters give the assurance that these Coolie ornaments, especially the collars, have been decided by the gentle sex, for whose delectation they were provided, "just too stylish," and therefore bound to have a run.

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SILVER watch cases decorated with elaborate etchings and showing an oxidized finish, which have for some time been exceedingly popular abroad, especially among English men and women, are now produced here in such a superior manner as to attract deserved attention from a large patronage. Beautiful specimens recently seen at a manufacturer's show rooms in Maiden Lane, represented a great diversity of designs, and afforded watches especially adapted for presentation to persons in every profession and walk in life. Sporting subjects abounded, there being cases etched with horse shoes, famous roadsters, prize mastiffs and winning yachts; then there were cases reproducing pictures from the Mikado, cases overlaid with the wild rose pattern, cases on which appeared well known landscapes, true enough to nature to be readily recognized, fac-similes of the photograph of one's wife or sweetheart, and cases with decorative surface, in the center of which appeared a graceful monogram. The oxidized finish gives to these etchings the required lights and shades to produce a pleasing and perfect effect, and renders the watches veritable works of art. The assurance is given by those who ought to know that these decorated cases improve with wear, the designs becoming with time more and more marked and clear. This etching, it is believed, will give quite an impetus to the sale of silver watches for both sexes, especially as one can have the cases etched to order, and thus secure in an enduring form the picture of a favorite scene, a pet or the face of a friend.

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THIS etching is not confined to silver watches, but appears also on gold cases. These latter, however, as yet may be said to be in their infancy, though very pleasing effects have been gained by an elaborately etched background with a bright finished monogram in the center, or one traced with small gems.

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THE goldsmith's art has always been more or less allied with jeweled and enameled work. From ancient times gems and colored stones have been employed for the enrichment of jewelry, their deep quiet hues contrasting admirably with the surface of the metal. There has never been a time in this country's history, however, when the gems and fancy stones have been more lavishly used by jewelers than now. In the ornamentation of much of our gold work appears the tendency to realistic effects, not only as regards form but coloring, and in such cases our manufacturers employ with excellent effect

both enamel work and small colored gems. One sees this in everything, watches, pins, bracelets and even necklaces.

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THIS desire for color and enrichment with gems has called in use not only all the precious gems and semi-precious stones, of which manufacturers are familiar, but countless fancy stones as yet unnamed in the jeweler's vocabulary. A collection of fancy stones from South America seen recently, is an instance at hand. These exhibited some rare and beautiful shades of color, and have proven to be a trifle harder than the average sapphire. It is proposed to set these in association with gems, as their brilliancy is sufficient to warrant this close contact, even if their rare coloring did not.

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A BEAUTIFUL finish on gold watch cases is what the manufacturer calls "raised wire work." This consists of a graceful design traced with tiny gold wire and set with small colored stones and gems. Sometimes this raised wire work is done in different colored golds, and sometimes platina wires assist the gold ones in forming the design. The case on which this wire work appears may be of bright gold, of Roman finish, or it may be enameled in any desired hue. The result is, in every case seen, decidedly unique and charming. The Queen chain accompanying each watch, it is hardly necessary to explain, is made to harmonize with the watch in coloring as well as in its decoration.

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WRITING of watches recalls the fact that there appears a decided and growing tendency again to decorated watch cases for ladies. Not only are cases seen with the raised wire work decoration, but there are cases beautifully enameled, and cases in the center of which appear a group of gems.

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REGARDING watch chains, there is not much that is new to be said. The chain must, of course, harmonize with the watch in coloring and decoration if the watch have a fancy case. Charms are now worn to quite an extent on the Queens, as many as three being seen on one chain.

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A CHAIN for gentlemen's wear, which is selling well on the road, consists of a double strand with sliding seal. The little bead pattern is very effective in this chain, and comes often in alternate beads of gold and platina. The rope pattern in small size continues popular in chains, and in this the twist often represents alternate strands of platina and gold.

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THE demand for neck ornaments is on the increase, and there are a number of very pretty "collarettes," as they are termed, this season. These collarettes fit close and high about the neck. An attractive pattern consists of two or more rows of bead work linked together. There are also collarettes composed of flat gold links set with small stones. Gold and silver beads worn in several strands

continue popular for neck ornaments. The necklaces have made pendants popular, and these latter are as fashionable as ever. There appears a decided tendency toward jeweled and chased lockets again, worn as pendants from a necklace.

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IN NECK pins there appears nothing especially new. Lace pins remain good selling articles, while the brooch or short pin is finding increased sales. Both are fashionable, and ladies exercise their own individual tastes in making selections between the two. A beautiful lace pin seen recently was in form of a miniature parasol, showing stripes of blue enamel and gold, with a handle set with gems. A pretty new brooch representing a cluster of hazel nut leaves and fruit, consists of gold leaves and cups frosted over with small diamonds, while the nuts are formed by a brown enamel.

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POPULAR styles among bracelets are polished wire ones, also the narrow link bracelets. These sell well everywhere. With bracelets, however, as with most other personal ornaments, there is a wide field for choice with no danger of being out of style. The "Hangman's Rope" pattern introduced last season in Paris, and patronized to some extent because of a curious superstition that the hangman's rope in gold is a lucky thing to have about, is seen here formed into bangles and bracelets, and also twisted into brooches. A bracelet seen simulated a rope, one end of which was untwisted showing the strands. Rings are also formed of this gold rope. A bracelet pleasing to very young ladies consists of a single gold band on which is hung a round or square charm of rock crystal. Sometimes these open in half like a locket, and show a four-leaved clover between the two layers of crystal.

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SEVERAL novelties have appeared in form of rings for gentlemen's wear. One pattern is known as the "Ram's Head." This, as the name indicates, is a ram's head of chased gold, the horns of which form the circle of the ring. A diamond, sapphire or other stone is placed between the horns, and thus makes a very unique setting at the top of the ring. A gold and platina ring that promises to become popular consists of six or seven very narrow rings interlocked together, and presenting the appearance of a ring puzzle when off the hand. This ring, however, on being slipped upon the finger adjusts itself into shape, and gives the impression of a number of fine gold and platina wires carelessly but gracefully twisted and knotted together.

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LADIES continue to wear the little fancy rings, set for the most part with small but very bright gems. There is a tendency to cluster rings again, the favorite arrangement being a large colored stone in the center with small diamonds set around it or *vice versa*. Four small stones of equal size and of the same hue, set so as to show no gold, forms a favorite setting. Three stones of different hues set up and down the finger are much seen on rings, and make a change from the more usual setting of the stones around the ring. Moonstones are set in rings for both sexes, and are decidedly popular in jewelry at the present time.

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ORNAMENTAL hair pins are now worn not only to dress the hair at

home, but on the street to keep the bonnet in place. When employed for this latter purpose these pins are usually of gold or silver, with tops plain sometimes, but oftener carved or decorated by a knot or ball. The pins are stuck vertically into the hair at the back, and not through the bonnet as an ordinary bonnet pin would be.

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THE most beautiful parasols seen this season have been in the retail houses devoted to jewelry and silverware. These have proven quite an attractive feature with their gold or silver-mounted sticks, and there appears no reason hereafter why parasols should not be added to the stock of umbrellas and walking sticks carried by many jewelers. All are entitled to a place in the jewelers' and silversmiths' stores, as it is to these they owe their beautiful handles.

ELSIE BEE.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

HOW TO REMOVE SOFT SOLDER.

To the Editor of the Jewelers' Circular:

Will you please inform me how to remove soft solder from gold and silver; and what is the most convenient way of cutting a recess in jewelry settings for the screw heads? I have reference to cock and foot end stones for American made watches.

By answering the above in the next CIRCULAR, you will confer a favor. Yours respectfully,
N. H. B.
Saranac Lake, N. Y., May 4, 1886.

[Remove as much as possible with a graver, and then dip the article in pure vitriol at the boiling point. Leave it only long enough to eat off the soft solder. Rinse thoroughly in clean water. On silver work the vitriol will tarnish the silver so that this method can only be used to advantage on such pieces as can be readily cleaned.—ED.]

HOW TO OXIDIZE SILVER.

To the Editor of the Jewelers' Circular:

May I ask through your columns for some definite directions for oxidizing silver? I often have a piece of oxidized silver jewelry to repair; heating of course removes the oxide, and if there is some practical way of restoring it, I would like to learn the process.

By various experiments I have produced a fair brown or gray shade, but the black I cannot get.

Yours respectfully,
W. L. HOPKINS.
Havana, N. Y., May 3, 1886.

[Apply hydrosulphate of ammonia with a brush, or dip the articles in it as may be desired. This can be used either hot or cold, or the following may be used: 2 oz. sulphuric potassa, piece saltpeter about the size of a hickory nut; dissolve in one pint of water, heat the liquid and either apply it with a brush or dip the article in. With one or the other of these preparations almost any effect in oxidizing can be produced.—ED.]

HOW TO PUT AN ADJUSTED WATCH IN ORDER.

To the Editor of the Jewelers' Circular:

We have heard so many complaints coming from members of the trade in regard to this matter, that we thought perhaps the pointing out of the difficulty concerning the remedy therefor would be of

profit to all concerned. Ten years ago we hardly sold one adjusted watch a year, now a large portion of the watches we sell are adjusted movements, I having sold eight the past month (April), and they are the best advertisement that a jeweler can have.

If a watch was going immediately into the hands of a customer without any preparation except what it received at the factory, I would rather risk a well made medium priced watch than a fine adjusted watch. The reason of this is that the adjusted movement is usually three times as long in stock as the medium grade that they have calls for every day, and it may have been out on approval and have been monkeyed with more or less by some knowing ones. If the following rules, which I practice on every adjusted watch I receive, are carried out, I will guarantee satisfaction not only to the buyer, but to the seller, for it is a satisfaction to sell a good time-keeper.

1st.—When you receive the movement look it carefully over outside to see that it has received no apparent injury; then taking out the slip under the balance, observe the motion in different positions and see that it has not only the same, but a good motion in any and all positions, with the mainspring one-half wound up.

2d.—Place a bristle or fine broach in the train so as to stop the motion; see that neither pallet hits against the scape wheel so as to hold the fork to one side; then with your strongest glass, observe that the hair spring, just where it goes through the pins, is exactly in the center, with about the thickness of the hair spring each side, or perhaps less. Also observe whether it is true in the round or flat; if everything is all right apparently, you can proceed to the first test. If the hair spring is not in the center of the pins when the balance is at rest, the stud must be turned until it stands so, but the pins must not be stirred under any consideration, and the banking pins must not be moved. If the watch is not adjusted to position, the first test should be made with pendant up (don't put the movement in the case yet). Wind it entirely up, set the seconds hand exactly with the seconds hand of the regulator, and let it run for 12 hours; make an observation and set down just how much it has gained or lost; leave it in the same position and set it again with the regulator; in 12 hours more observe the variation. Say in the first 12 hours it gained 30 seconds, and in the next 12 hours it only gained 20; 10 seconds difference between the first and last coils of the mainspring. If the hair spring is isochronized, 5 seconds is as much variation as should be allowed, if the observations on the works and hair spring have found them correct.

In a movement costing over \$15.00 I should send it back if I had found in these preliminary trials the variation between the first and the last observations exceeded five seconds, or if the movement was running fast or slow to exceed one minute either way per day, for if the regulator has to be moved much the isochronism of the spring will suffer.

If the watch is adjusted to position it should be tried in different positions, each time setting it exactly with the regulator and using the same strength of mainspring for different positions, and if in a 6 hour trial in each position, it should not vary more than three seconds from the standard or vertical adjustment, I should retain it.

Some may consider these conditions rather severe, but if the movement was in the condition described before being tested, I have not had to return but three out of hundreds tested and sold.

We now come to the part where some suppose there is a sort of witchcraft involved, but as our article is already too long we will continue next month. In the meantime we would like to tell every member of the craft to procure a copy of "Excelsior's Treatise on the Balance Spring" and study it; not just read it over, but learn it almost by heart by constantly referring to it as occasion requires.

I think Excelsior has set the standard of (or what may be expected of) the American adjusted movement very low, but perhaps it is better not to expect too much.

ADJUSTED.

THE COMPETITION DEALERS ENCOUNTER.

To the Editor of the Jewelers' Circular:

Every week brings something to perplex the patience, and make us jewelers sigh for some remedy to overcome the drawbacks we are subjected to. Of course "New Blood" is a believer in the old saying of "every one for himself and the devil for us all," but by the time the unscrupulous wholesalers had got the cream of the job, of course we jewelers, who pay rent and taxes, and try in every way to do as we would be done by, must be satisfied with the skim milk. If manufacturers do not care about protecting the regular merchant, why, come out point blank and admit it. If we must see our goods remain unsold in our cases, why are they anxious to sell us? Why don't they take the dry goods, clothing, fancy goods merchants and done with it; have it understood that they do not want their goods sold by an expert or a regular jeweler who will condemn the trashy stuff sold by many made of 8 kt. with a 18 color, with cheap, trashy ear wires, and gold center watch cases with plated rims. Perhaps the manufacturers are getting too conscientious, and it makes them shudder when they think that the jeweler knows that good goods cannot be given away with suits of clothes, and cheap tea. Watches, jewelry and silver plated ware have got to so low a standard that every farmer who will open a store and put in groceries or shelf goods, will have a supply of articles that years ago could not be found at any place but a reliable jewelry store. It seems strange that a dealer after putting in a stock of—we will say silver plated ware—the same firm of whom the goods were purchased, will furnish goods to parties to peddle in the same territory, which is no more than stealing the trade which belongs to the dealer. The parties who do the peddling are no judges of the goods, and all they care for is the profits arising therefrom. In many cases they have never handled anything before other than a plow, or perhaps been a land shark on a tin cart. Within a week we have had the pleasure of having to contend with a great pebble spectacle peddler, covered over with badges on his breast said to have been received from different colleges. He tries to make everybody believe the spectacles they use are ruining their eyes, and prevails on them to buy a pair of his "only and wonderful glasses at \$7.00, which magnify so as to enlarge the object," and he is gone and the \$7.00.

There is also a jewelry shark who gets around once a month to catch the pay days at the mills, and he reaps a fine reward, having no license, store rent, clerk hire or gas bill to pay. The same week there came a silver ware wagon with two men selling on installments, run by men who would have the cheek to come in our store and argue that the house they travel for is rich, sending out eight hundred men, and that the day is not far distant when plated ware will be sold altogether on the installment plan, which of course is very pleasant to us jewelry merchants. They also carry the small nickel clocks, which at present are the great drawback in the sale of the better class of the American clocks. People will buy goods when brought to their house and spread out before them. Their plated ware is good, the name of the maker stamped on it well known; the clocks they carry are just as good as we keep in the stores. Why not boycott all manufacturers who know their goods are being peddled contrary to their wishes. In large cities there are stores of great magnitude that keep everything from diamonds to calico and clothes pins; they are advertised in all country newspapers. The cars of to-day are crowded with purchasers having bundles of goods bought at these large stores, and yet the country is full of drummers selling goods of all descriptions. Their traveling expenses we have to add to the retail price of our goods, and the large city buyer can job and get the benefit of our being in business where we must be supplied by the traveling man. Cities of any importance now have from one to a dozen general stores, carrying large stocks of goods, and consisting of dry goods, jewelry, crockery, hardware, furniture, carpeting, and in fact everything handled over the counter but whiskey, and with prices cut down to penny profits. Goods of any worth are slaughtered and shoved out at ruinous prices. New manufacturing

establishments are springing up, and of course they must all live. Give us better goods; abandon the drummer business; give the merchants the benefit of several little extras put on the stock, and we can much better keep up the leading watch and jewelry specialties of the day.

GOFORPHEM.

N. Y., May, 1886.

A RETAIL DEALER DEFENDS HIS CLASS.

To the Editor of the Jewelers' Circular:

I have been very much interested in the communications printed in your magazine from members of the trade. The discussion of trade matters, and especially trade abuses, cannot but be of benefit to all concerned. Some of your correspondents have dwelt very much on the abuses that come from manufacturers and jobbers selling goods to outsiders at the same prices they sell to regular dealers. I cannot but admire the stand taken by "New Blood" in his letters; he boldly declares that, as a manufacturer, he will sell his goods to whoever wants them and has the money to pay for them. He has the courage of his convictions, and, unlike many others, he does not hesitate to give good reasons for his course. There are plenty of manufacturers and jobbers who do precisely what he does but persist in denying it. I can admire a man who stands up to the rack and is ready to confess his misdeeds and give reasons for them, but there is no doing anything with a sneak who does the same things and lies about them.

"New Blood" gives as a reason for preferring the outside trade the alleged fact that outsiders are better business men and better pay than retail jewelers; he complains that we buy goods on four months' time and then want an extension; that we buy in small quantities, and demand a great variety of favors that the outsiders do not. Granting for the sake of argument, that all he says is true, I beg to ask him who it is that make the customs of our trade, especially those relating to credit? Is it the buyer or seller who fixes prices and terms of payment? My experience as a buyer is that I have very little voice in either; I make my selections and the prices and terms are given me by the seller. But my experience has also taught me that increasing competition has made sellers more liberal; in fact, they are so fearful of losing a customer that they bid against one another to see which can give him the lowest prices and the longest time for payment. It was the sellers who fixed upon four months as the time for notes to run; it was the sellers who introduced the practice of dating a four months' note two months ahead, so that the buyer really had six months in which to pay for the goods he ordered; it was the sellers who, in their anxiety to load down buyers with goods, said to them substantially, make your order a liberal one and take your own time to pay for the goods; give us a four months' note and we will renew it as many times as you wish if you will only pay the interest. But there are but few dealers who like to be so liberal, so the sellers have got in the habit of selling them samples of goods that they may see how they take at home in the hope that they will order more when they get home. It is the sellers of goods who have introduced all the unbusinesslike practices in regard to credits; they have the whole matter in their hands, and they have only to say we will sell for cash only and the buyers have got to come down with the cash or quit the business. The fact is the trade is overdone; there are too many manufacturers, too many jobbers, and too many retail dealers. Competition is so great that all sorts of devices have to be resorted to in order to dispose of any goods at all. Profits have gone where the woodbine twineth, and if we can make both ends meet we are lucky. "New Blood" and his class only make matters worse when they sell to outsiders and so introduce additional and reckless competition.

He says he will sell to whoever has the money to buy; does he think this is treating the regular dealers fairly? Suppose I buy goods of him; it is to be presumed that I know my market, and that I buy as liberally as my market will warrant; after selling me all he can, he jumps into town and persuades a dry goods dealer that if he

will take a line of his goods they will serve as a leader, to induce customers to come in, and so he will sell more of his legitimate stock—is not this robbing me of my legitimate trade, and forcing upon me a competition that cannot be otherwise than ruinous? The drygoods man only uses jewelry as an advertisement; he does not expect to make a profit on it and can undersell me because this is my only business, and from it I must make whatever profit I get. Just this competition has been forced on me and it has cost me many a hundred dollars. There are many persons selling jewelry who have no right to be regarded as retail dealers, and many of them should be at the bench working for wages; but they have been tempted to set up for themselves by over-zealous drummers, who have persuaded them that they have only to ask for credit to get all the goods they want, which is very nearly true. Credit is fairly forced upon them. I know that when I have visited New York I have been besieged by drummers, who insisted that I should take a line of their goods on my own terms, even though I had repeatedly told them that I could not use them. I have even had them ship me goods after I had positively refused to take them. When sellers are so anxious to get their goods off their hands, is it any wonder that those who consent to take them make the best terms possible? And I have yet to learn what terms would be refused by some of them. The ambition of some of them seems to be to book an order in any way, and trust to luck to get their money. For my part, I wish your Board of Trade, or some other authority, would reorganize the credit system in the jewelry trade, so as to require that every man to whom credit is extended shall have a little something at stake in his business, and not ruin it on borrowed stock. There is much to be said on both sides of this question, but in my judgment, the manufacturers and jobbers are responsible for the demoralized condition of the jewelry trade at the present time.

J. H. M.

Ohio, May 17.

NO USE FOR CATALOGUES.

To the Editor of the Jewelers' Circular:

I entirely agree with your correspondent, "H. J. M.," in your May number, that catalogues are not only useless, but an injury to the retail trade. They are liable to fall into the hands of outside parties, and although they may not contain price lists, they do give the name and address of the manufacturer, and curiosity often leads them to write to them direct, or to send to some jobber in a neighboring city for goods or prices. There is a prevailing idea that retail dealers make enormous profits, and if an intending buyer can slip by them and go to the manufacturer or jobber for what he wants, a great saving will be made. I have had hundreds of persons tell me that goods they had were bought at "manufacturers' prices," and intimate that I could not sell them anywhere near as cheap. How comes it that so many persons buy directly from first hands? They surely do not all belong to families of manufacturers, but somehow they contrive to get wholesale prices for goods bought at retail, from those who declare that they sell only to the trade. We all know that our strongest competition comes from outsiders, and I am convinced that the promiscuous distribution of catalogues has done more to induce customers to jump over the head of retail dealers and buy direct from the manufacturer, than anything else. For my part I have no use for catalogues, and take especial pains to destroy all I receive as soon as I get them, lest they should fall into the hands of outsiders. Commercial travelers furnish the retail trade with all the opportunity necessary to become familiar with kinds and styles of goods, and catalogues are an ever present danger so long as they are tolerated. Some houses spend thousands of dollars every year in getting out beautifully illustrated catalogues; it seems a pity to destroy them, but every one that comes to me goes into the fire. If the catalogue makers would dispense with this kind of advertising, and spend their money educating the public to a better appreciation of fine goods, they would be doing better service for themselves and the retail trade also.

DEALER.

Buffalo, May 15.

SOME VENERABLE CLOCKS.

To the Editor of the Jewelers' Circular:

I have an old style, tall 8 day hall clock, brass movement, winding with a key, and marked "Jonathan Jessop, Sark Town, Pennsylvania, No. 58." Also another one—similar style wood movement, runs one day and winds by pulling a cord, marked "R. Whiting, Winchester." Can you tell me through THE CIRCULAR about when they were made and where?

W. P. S.

Bath, N. Y., May 17, 1886.

[A gentleman well informed as to the subject says that regarding the first named maker there is no definite knowledge obtainable. The name is probably "Park Town" instead of "Sark Town." The place being named after a celebrated clockmaker by the name of Park, who flourished there in the latter part of the last century, and Jonathan Jessop was undoubtedly a contemporary. As to the latter, Reily Whiting was a native of Winchester, and made the old style hang-up wood clocks both there and in Winstead, to which place he removed in 1809. At the time of his removal to the latter place he married the sister of Samuel and Luther Hoadly, who, at that time, owned a saw and grist mill on the present site of the Wm. L. Gilbert Clock Co.'s factory. Clock making was added to the other industries, and in after years entirely superceded them, and has been carried on almost without intermission ever since. Mr. Whiting's death occurred in 1835, at which time he had built up quite an extensive business.—ED.]

HE WANTS A UNIVERSAL TESTING ACID.

To the Editor of the Jewelers' Circular:

Will you please inform me through your valuable paper how to make a testing acid to test gold from eight to eighteen karats, and greatly oblige,

A SUBSCRIBER.

New Orleans, May 13.

[There is no testing acid that will do what our correspondent desires. An acid that would not affect eighteen karat gold would destroy entirely eight karat gold, and acid capable of testing eight karat gold would make no impression on eighteen karat. Whoever will invent a universal testing acid will have a fortune at his command. The practical way of testing is to experiment with acid of graduated strength, and when it suits use it. But it will lose its strength by exposure, so that an acid that is satisfactory to-day may be good for nothing next week. The world is anxiously looking for an infallible and universal testing acid, but until the precious metals are all brought to one degree of fineness it is not likely to be found.—ED.]

HE APPROVES OF OUR FASHION NOTES.

To the Editor of the Jewelers' Circular:

I take pleasure in informing you that I have derived great benefit from the advance sheets of your fashion articles that you send out every month. I received the first you sent, and immediately wrote asking you to send all that you might issue in future, and I have been receiving them regularly ever since. Following your suggestion, I gave them to the editor of a local paper, and he prints extracts from them every week, and is so well pleased with them that he comes for them promptly, and is alarmed lest I should some time give them to his competitor. I know that they have induced many persons to come into my store, and the proof of it is that they ask for the goods mentioned in the fashion articles. Ladies, especially, as was to have been expected, take the most interest in them, but I have had gentlemen ask for scarf pins and cuff buttons that were mentioned in the notes, and I am sure that all they knew about them was that "Elsie Bee" said they were stylish and fashionable. Since I gave the first one to the editor he has made a regular fashion department in his weekly, and he tells me that it has helped his paper wonderfully. Everybody is more or less fond of dress, and everybody likes to read about it, even the sterner sex not being above

taking a peep at the fashions. I look upon these articles as just what the trade wants to overcome the prejudice that existed for a time against jewelry. Now that it is again coming into vogue, there is more curiosity than ever to know what the styles are. I see you still ask dealers to send for the advance proofs, and I simply desire to say that I am satisfied that every dealer can use them to advantage, and the more generally they are circulated the better it is for all of us.

I was greatly grieved to hear of the great bereavement that befell Professor Waldo, for I had become much interested in his articles; I sincerely hope he will be able to resume them at an early day. THE CIRCULAR has always been the best paper the jewelers have ever had, giving us good practical articles that were valuable. I wish it all possible success.

C. M. G.

Toledo, May 12.

SAW MILL CORNERS, HOP-BOLE CO., WIS., May 12th, 1886.

Mr. Editor of Schulers Zerkeler:

Dat Connwenshun was a liddle to much for me; denn de wedder was werry wahn, and I siehn lots of freinds frum de Vaderland, and dat Millwohgee Beer was so guht, dat I must dell yoo in schrickt gonfidense dat I was a liddle brohk up wenn I game home, & dehr was a liddle gicking from the bedder half uf de household, and wenn dat got dru wid me I doht I was only de eight bard of dat Silinderad midouht de teed. de abof yuh dount need to but in de baber. Well we meet as yoo herd at de doun of Waderdoun but I dell yoo dohs Schulers did not gare wedder id was a Waderdoun denn you noh lagerbeer is gut enoff.

Now do Bissness De Conwenshen was obened bei de Wise Bresident Misder Sproesser of Waderdoun breesided ofer dat meeding. Well de Segretary & de Cassierer mede dehr rebords and eferie body was sadsifeid und de meeding danged dem and bresended de Segretary wid a dwendy-five dollar Bill as a dogen of reschbeckt. Well der was a good deehl of dolking and finding folt mid does shobbers dat sell ad redehl and send ouht gatalogs du de bublick wenn I doht de dime hed cum dat I shud dell dis beebel wod I dohd about dees komblehnts and I rose and sehd Mr. Bresident may I heve de flohr and he sehd Shentelmen Mister Silinderad from Saw Mill Corners will now address dis meeding. and I commensed & sehd in a very imbressite schteil Mr. Bresident and Shentelmens Der is no juse fur us to gome dugedder and comblain wenn wie do nod akt and I brobose du dell you how do akt so dat does kumplehnts will be ridet. First You sey id is rong dat schobbers hev redehl schdohrs well id is sheehkie fur a man du ask yu du buy guhds frum him and den he dries eferyding du sell du de sehm gusdumers as yu du and mehbe he dells yuhr gusdumer dat yu buy all yure guhds frum him & dat he will sell yur custumer shieber denn he will yuh and wenn I sehd dis eferybody glabbed his hand & sheered & sed dats so & I sed you bet. & denn you gomblehn uf dohs houses dat send gataloges and brise lists to eferibody & you seh dat diehs mide gome in rong hendes well dat is shust de bleze wehr dohs dat send dem wond em du gome & I give you a liddle illustrashen up dat. In my blaze de duckdor, blackschmidt, Lifery schtebel geeber, grocer, Justuce uf de bees, ohl hed gataloges send dem frummi some schikago house and brise lists wid dem and de schkuhl meister sed du me dat he did nut get won and he wudd like du hef won do leksher du his schkuhl obon de enderbrise af Shikago shulerie houses and I dohd him du ride du de house bud he shud seh dat he hehrd vun uf his yung lediehs seh dat shee wonded du buy a nise blehded lucked du but hur bohs bicksher in and he rohd and in less denn no dime dey send him de kataloke wid brise lisd and dey eksused demself dat dey did nut send him won bevore and de hobed he wudd ged lods of ohrders for dem and if he did dey wudd send him a nise krissmess bressend fur his drubbel. Dod is de weh does kataloges are send du de dreht only and de connwenshen shust mede dat hohl sheke wid ablouse and sed dat so. Now sehs I du brodekt ourselves

frumm dis nusense I ask yure bermishen du bresent de folloeing reselushen and I red of de beber dat I brohd wid me frum home.

Weras Serdain holesehl shulery houses du redehling end derebi inshur our bussiness deirektli and indeirektli and

Weras de sehm houses send ouhd kadalokes du reech does beeble dat gannot gome du see dem and

Weras, we dink dis a direkt ademtp du get ouhr bissness aweh frum us. Be id derefore

Resolfed, Dad we obligade ourself not du buy af ennie house dat hes a redehl Schdohr or sends auhd kadalokes or prise lists.

Resolfed dat we will juse ohl our influense du meke ohl dose dat are nod wid us du day du ligewise.

Resolfed dat we gif our drehd du ohnlie sutch shobbers dat don't hef a redehl schdohr or send ouht katalokes.

Diss wass junanimuslie adopted.

Denn I sehd I dank yu shendelmenns and I hobe yu will ohl du so.

Denn de meeding adshourned du meed in Millwohgee neksht yeehr.

Dot is abouhd ohl dat was done and I hobe I sadisfeid yu in yuhr exbekdashen denn I noh dat yu ahr de ohnlie beber dat effer hed de moral kuretsch do ekbress diehs sendimends.

And den we had some more beer.

Druhly Yours, JOHANNES SILINDERAD.

P. S. I hobe you will ride a liddle editorial en dis do let me no if yu are satisfied.

[The lucubrations of our correspondent are entirely satisfactory, and his conclusions will be heartily approved by all who comprehend them. He is respectfully requested to do so some more.—ED.]

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

Business, as might have been anticipated, amid the excitements and strikes attendant on the inauguration of the eight hour movement, has been rather dull. The terrorism inspired by the dastardly dynamite outrage perpetrated by the anarchists, had for a little also an unsettling and disquieting effect on trade generally, but since the people have come to see that the municipal authorities are perfectly able to cope with the lawless element in the community, confidence is becoming reassured and business is picking up. The anarchistic outbreak, bloody and disastrous though it was, has brought good out of evil, for sympathy was drawn away from many of the strikers whose demands were unreasonable, and the result is that over two-thirds of the men who were out at the beginning of May, are now industriously at work again. The collapse of the strike and the consequent raising of the blockade in the Southwest have again opened up that fertile territory for business, and jewelry jobbers once more have their men in the field pushing business. Reports from all parts of the West, Northwest and Southwest show business to be fair, though by no means active. Money is rather scarce, collections a trifle slow, but the tone of business, in spite of the trials and difficulties with which it has had to contend during the last month or two, is thoroughly healthy. No strikes or lockouts have occurred to unsettle either the jobbing or the retail interest. Attempts at organization have been made by certain employees, but so far no demands for shorter hours or increased pay have been made upon the employers.

Early closing on Saturdays was inaugurated by all the leading jobbers May 1, so customers who chance to come to town at the end of the week should take notice that their wants cannot be supplied on Saturdays this summer after 1 P. M. The movement, it is needless to say, is very popular among the clerks and workmen.

Charles Strickland, a retail jeweler, committed suicide at his resi-

dence, No. 2241 Indiana avenue, by shooting himself through the head. He had only been released from the Washingtonian Home for Inebriates, to which he had been committed by his wife and children after a periodical debauch. Mr. Strickland came to Chicago from London, England, only last September, and bore a good reputation there for business capacity and integrity. He was in low spirits when he committed the rash act, and leaves his family poorly provided for.

A special meeting of the National Association of Watchmakers and Jewelers was held at the Palmer House, May 12, to take action on amendments to the Constitution and By-Laws. T. B. Meyers, of St. Paul, Minn., Vice-President of the Association, occupied the chair, and Mr. H. Berg was Secretary.

The Secretary submitted an amendment to Article 9 of the By-Laws, providing that the initiation fee should be \$2 instead of \$5 as formerly. The amendment was strongly supported by Messrs. E. R. P. Shurley and C. H. Rowe, who pointed out that such a change would lead to a large increase in the membership, and that the present satisfactory financial condition of the association could be maintained with a lower initiation fee, now that all the heavy preliminary expenses had been met. A vote by ballot resulted in the unanimous adoption of the amendment.

The following resolution by E. R. P. Shurley was unanimously adopted:

Resolved, That the action of the National Association of Watch Movement and Case Manufacturers of the United States, in their decision to cut off all jobbers who sell to those outside the legitimate jewelry trade at wholesale prices, meets with our hearty indorsement and approval.

The Secretary read a communication from Messrs. H. Z. & H. Oppenheimer, No. 25 Maiden Lane, New York, mentioning that it was proposed to form a similar association there, and asking for copies of the Constitution and By-Laws and other advice. It was unanimously resolved that the request be granted, and that the association about to be formed be invited to co-operate with or join the National Association of Watchmakers and Jewelers.

Vice-President Meyers, who was warmly congratulated on his first appearance at the meetings of the association as an executive officer, gave an interesting account of the generally satisfactory condition of business in the Northwest.

On motion of L. F. Hussander it was resolved that the Chair appoint a committee of three to wait on all jobbers and retailers who have not as yet joined the association and solicit their membership. Vice-President Meyers, after a consultation with the Executive Committee next day, decided that this work would be best accomplished by Mr. Mooney, the Assistant Secretary of the association.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of April 13, 1886.

339,657—Clock, Calendar. U. V. Jaeggi, Auburn, South Australia.

339,867—Clock Pendulum Regulator. W. D. Davies, Brooklyn, N. Y.

339,860—Watch Case Spring. H. F. Cook, Sag Harbor, N. Y.

340,044—Watch Dial. G. Hunter, Elgin, Ill.

340,045—Watch Dial. G. Hunter, Elgin, Ill.

339,922—Watch Dials, Machine for Spacing. F. B. Perkins, Elgin, Ill.

- 339,875—Watch Key. M. W. Geary, Lock Haven, Pa.
 339,943—Watch Movement Packing Box. C. H. Smith, Elgin, Ill.
 339,862—Watch, Stop. C. P. Corliss, Elgin, Ill.
 339,870—Watches, etc., Safety Attachment for. O. G. Faber, Washington, D. C.

Issue of April 20, 1886.

- 340,483—Clock System, Electric. J. E. Carey, N. Y., Assignor to the Electric Time Company.
 340,108—Jewel, Rotary. H. & G. Gaenbslen, Wurtemberg, Germany.
 340,366—Watch Case Pendant and Bow. T. Robin, Hyde Park, Mass.
 340,507—Watch Dial. G. Hunter, Elgin, Ill., Assignor to Elgin National Watch Company, Chicago, Ill. 2 Patents.
 340,467—Watch Pendant and Bow. L. J. Killerot, Besançon, France.
 340,366—Watches, Device for Letting Down the Mainsprings of. L. R. Taft, Assignor to Illinois Watch Company, Springfield, Ill.

Issue of April 27, 1886.

- 340,950—Clock Case. E. M. Judd, Wallingford, Conn.
 340,867—Timepieces, Winding Indicator for. J. E. Ehrlich, Baltimore, Md.
 340,854—Watch. A. D. Bingham, New Haven, Conn.
 340,936—Watch Barrel. S. T. J. Byam, New Haven, Conn.
 340,855—Watch, Calendar. G. Blanchard, New York, N. Y.
 340,814—Watch Case. D. O'Hara, Waltham, Mass.
 340,850—Watches, Stem Winding and Setting Mechanism for. C. V. Woerd, Waltham, Mass.

Issue of May 4, 1886.

- 341,111—Clocks, Electric Synchronizing Mechanism for. J. S. Ross, Nashville, Tenn.
 341,095—Watch. F. R. Cutter, Somerville, Mass.

Obituary.

CHARLES E. HAYWARD, OF ATTLEBORO.

Mr. Charles E. Hayward, of Attleboro, died at his residence in that city May 4, of a heart trouble combined with asthma. Mr. Hayward was born in North Attleboro, August 28, 1834, and served his time with Tift & Whiting. He subsequently engaged in the manufacture of gold settings, but in 1851 he associated himself with Archibald Thompson, S. M. Lewis and S. N. Carpenter, and, under the firm name of Thompson, Hayward & Co., entered upon the manufacture of jewelry at Mechanics. It was successful from the start, and soon removed to East Attleboro. This firm was dissolved after a few years, and Mr. Hayward and his brother-in-law, J. A. Briggs, established the firm of Hayward & Briggs, which was also very successful. Last July the firm was dissolved, and Mr. Hayward and his son engaged in business under the firm name of C. E. Hayward & Co. Mr. Hayward's health being impaired, he went to California in November last, but the change brought no improvement to his health, and it was with difficulty he reached home. He lingered until May 4, when he quietly expired, surrounded by his family and friends. Mr. Hayward was President of the Attleboro Farmers' and Mechanics' Association, a prominent member of the Odd Fellows and a director of the First National Bank, all of which organizations passed suitable resolutions to express the sorrow they felt at losing an associate and fellow worker so highly esteemed. The deceased was a man of ability, integrity and rare executive ability; he was genial in his disposition and courteous to all, making friends readily and retaining their respect and esteem permanently.

JOSEPH STERN, OF NEW YORK.

Joseph Stern, of the firm of Stern & Stern, died on Thursday,

May 20, at his residence in this city after an illness of seven months, at the age of 49 years. He was taken sick Oct. 19, and, after a little time, his disease developed into internal abscesses. He employed the most skillful physicians in New York, who performed three operations upon him without accomplishing the desired result. He suffered the most intense agony the whole time of his sickness, and died leaving a host of friends to mourn his loss. He was always genial and pleasant in his intercourse with the trade. He was actively identified with several of the most prominent of the Hebrew charitable institutions of this city. Mr. Stern commenced business in 1865 in Maiden Lane, having an office in the office of Messrs. Oppenheimer, Dinkelspiel & Co., marrying the niece of Mr. Dinkelspiel, after continuing his business for two years. In 1867 he formed a co-partnership with Mr. Henry May, under the firm name of May & Stern which was continued until 1882. In the month of May of that year he formed a co-partnership with his brother, Simon, who had already been in business for some time, also associating with them their brother, Jacob, under the firm name of Stern & Stern, Joseph being the financial head of the concern. He was taken away practically at the height of his business prosperity. The firm will continue under the same style. The deceased leaves a wife and four children. At the funeral the trade was largely represented.

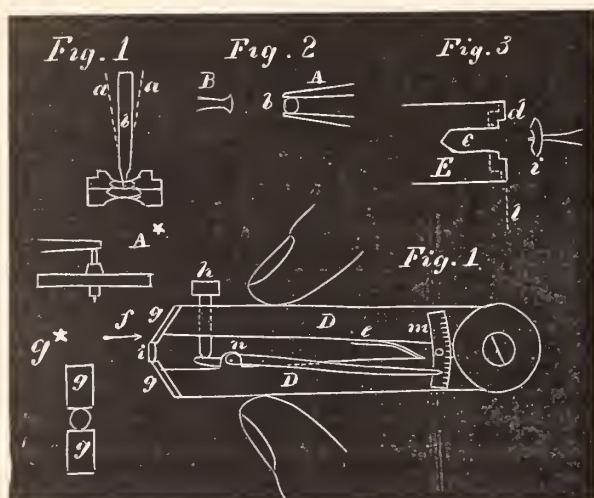
Problems in the Detached Lever Escapement.

BY DETENT.



THE TEST pivots mentioned in May number of this journal should range in size from the smallest to the largest balance pivots, and six sizes for this small range of pivots, will make the sizes pretty close, and in actual practice we can turn our pivots still closer to the correct size. At fig. 1 is shown one magnified and in position to show the manner of using it. We will suppose, to illustrate, a watch comes in with a broken staff. Now the whole end and aim of watch repairing is to do the best work the quickest; we are not going to get pay for cleaning, all we want is to get a new staff in as soon as possible, *and do it well*. We take one of our test pivots and insert it in the lower hole jewel, and see how it fits; if it goes in easily, and as the watch is tipped to first one side or the other, the test pivot falls to one side about as indicated at the dotted lines *a a*, fig. 1, we can be assured the test pivot is the right size. In testing in this way the watch should not be turned too far or too suddenly so as to break or bend the test pivots or the jewel, and for the very finest pivots, the wire of which the test pivot is turned should be smaller and lighter than $\frac{1}{16}$ of an inch, the size given in May number. If in testing our test pivot seems a little tight and the next size too small, in turning our pivot take it into account and produce a pivot between the two sizes; as for instance our test pivot measures 12 on the gauge and the other 14, turn your pivot 13 by using six test gauges for the range proposed; we will not have a difference of more than $\frac{1}{2500}$ of an inch between them. It is well to notice when the test pivots are inserted in the hole, if the piece of wire on which the pivot is turned falls equally over all around; if it does not it indicates the hole in the jewel is not drilled true or the jewel badly set. In either case care must be taken, or the pivot which measures small enough will pinch when running. This is a fault common in cheap Swiss watches. We have now got our pivot size, and by means of the gauge shown at fig. 3, May number, then turn our pivot to match. The top hole is got and measured in the same way, but in getting our heights, we must remove our end stone from the cock. We will describe subsequently a measuring tool for getting heights, but first let us finish the pivot and jewel portion of the problem. In fitting an unset jewel to a pivot, we need a pair of tweezers, kept

especially for this purpose, the points of which are recessed to give greater security to the holding. At fig. 2 is shown at *A* the point of a pair of tweezers for holding a jewel. The points of the tweezers are cut out with a drill shaped as shown at *B*. The jewel is applied to the pivot as shown at diagram *A**. The jewel rocked and tilted to see if about the same play and side shake exists as shown in the dotted lines at *a*, fig. 1. As an additional test we can try the largest test pivot which will go through the hole, and compare this with the pivot on the staff by the taper Jacot gauge. We will next set a jewel in its brass setting, as we advised the reader to buy his jewels unset. The best jewel after a genuine ruby is a chrysolite—get the best; they are the cheapest in the end, and give the workman better satisfaction. Select a piece of large brass wire; have it something larger than the setting, because it will have to be turned down somewhat; put it into a split chuck and drill a hole in end as shown at *c*, fig. 3, where *E* represents the brass wire considerably magnified. We next turn in a recess as shown at *d*, which will just receive the jewel which is shown at *i*, attached to a piece of sharpened pegwood. If a slight burr is turned on the extreme edge of the jewel sink at *d* with a burnisher, it will serve to catch and hold the jewel *i* until we can securely burnish it in. The next thing is to turn off the wire *E* until it is the right size to go into the jewel recess in the cock or potence. Here we have struck another want for a measuring tool.



A Grossmann gauge will do it but it is too large to use conveniently, and we cannot take our wire out of the chuck and put it back without risk of losing the center, and even if we could it is too slow. The writer saw an ingenious gauge made by a fellow craft the other day, and with his permission will describe it; it was made from the top of an old pair of 25c. brass dividers, using about two inches next the joint, as shown in fig. 3. A spring at *e* served to open them at the end for about one fourth of an inch. And the ends *g g* are fitted into steel jaws as shown; these are for measuring the work. A screw which worked through one of the arms *D* is shown at *h*. It is by means of this screw we get the close measurement. Inside one of these arms is a lever or pointer *n*. The idea is if we should take out the screw *h* the arms *D D* could be closed—by applying the thumb and finger as shown—until the jaws *g g* come together. If now we should insert something—say the jewel *i*—between the jaws *g g*, they would only close to the diameter of the jewel. Now it will be seen that as the arms close the screw *h* can be made to strike the short end of the lever *n*, magnifying the motion 8 or 10 times on the index *m*. Suppose now we have the old jewel setting, which of course is the right size; we place it as shown at *i*, take arms *D D* between the thumb and finger, and by means of the screw *h*—worked with the other hand—bring the pointer *n* to the zero mark on the index on the scale *m*. If now we turn the outside of the wire *E* in which our new jewel is set until, when taken between the jaws *g g*, the index hand *n* will point to zero on the scale *m*,

we can be sure our new jewel setting is the same size as the old one. If now we turn the setting to correspond to the dotted lines, and cut it off from *E*, we have our jewel setting in the rough. We next cement it to a small flat faced chuck, and center by a pointed pegwood in the jewel hole; we next turn the inner part of the jewel setting to our mind. By using a highly polished graver we can get the polish we see on the jewel settings of new watches. Such a gauge as shown in fig. 4, if carefully made, will indicate very easily as close measurements as $\frac{1}{1000}$ of an inch; although in reality it shows no definite part of an inch. If very carefully made it could be used for pivots.

A Charm Brooch.



HERE IS now on exhibition at the store of Mr. E. B. Hayden, Fulton street, Brooklyn, a piece of jewelry that illustrates at once the remarkable skill that barbaric artificers in the precious metals can display with their crude tools, and, by contrast, the great perfection attained in similar efforts by the aid of machinery and the appliances of civilization. It is a gold brooch in the form of a target-shaped shield, containing about fifty dollars' worth of fine gold. It is three inches in diameter, and in the center is a boss or spike about three-quarters of an inch high, rising from the middle of a St. Andrew's cross, the spaces between the arms of which are filled with arabesques of delicate filigree work, the whole forming a very artistic and attractive piece of jewelry. Its history is as curious as its workmanship, for it is said to be over three hundred years old, and comes from Ashantee on the west coast of Africa. The story told of it is as follows:

Dr. Henry T. Reilly, brother of the Irish patriot of the '48 movement and subsequent democratic journalist of the Pierce and Buchanan period, has been on the west coast of Africa for the past thirty years, and when the Ashantee war of some twenty years ago ended in the success of the English and the killing off of their semi-savage foes and the burning of their villages, he was called upon to attend a party of six of the native chiefs who were confined as prisoners in Cape Coast Castle, and who had taken sick from confinement, bad food and other ills. He treated them with great kindness and saved the lives of all but two. When the survivors were released they returned to the doctor's residence in a few weeks bringing with them three gifts of beautiful workmanship, two of silver and the third this gold brooch. They explained that it was called the "Charm Brooch" and had been in the tribe over 300 years, and the tradition was that as long as it was worn by their chief no foreign enemy could invade their territory. As the English had overcome the tradition, they thought the charm was broken and the brooch of no further value to them, hence they gave it to the doctor as a token of their appreciation of his kindness to them. The doctor sent the gifts home to his relatives, and they were exhibited for some time in Dublin. One of the silver ornaments was given to Lady Herbert, of Lea, and the other to Sir John Pope Hennessy, now Governor of the Mauritius. The "Charm Brooch" was sent out here to America to a relative, who has had it for the past fifteen years, and who recently presented it to Mr. Thomas F. Meehan, of 205 Greene avenue, from whom Mr. Hayden obtained it for exhibition.

SOLDER FOR 9-KARAT GOLD.—Three parts gold, 2 parts silver, $\frac{1}{2}$ parts copper, fused together, with the addition of $\frac{1}{2}$ part zinc, make a solder that will run at a dull red, and one that is in general use for jewelers' ordinary work.

Foreign Gossip.

NEW SWISS WATCH.—The celebrated Longine watch factory of Switzerland have manufactured and thrown upon market a cheap anchor stem winder, intended to be a rival to our Waterbury watch. It is called the "Chasseral."

OLD WATCH.—The watch of a blacksmith in Sanders Co., Neb., is a rare curiosity, not on account of its case, but because, after the lapse of 228 years, it still preserves as good a rate as any modern watch. It was made in Liverpool, England, in 1658, and is a good sample of the work of the watchmakers of that age.

COLORADO'S INDUSTRIES.—Among the new industries of Colorado is the production of beautiful tableware from the slag, resulting from the smelting of gold and silver ores at Argo in that State. The colors are a sort of a spray of onyx and opal, flushed in waves throughout the ware. Some of this ware has made its way East, and is unique, to say the least.

BOLD ROBBERY.—Two robbers entered the store of the diamond trader, Tabuk, in Belgrave street, London, a short time ago, and, he being alone, beat him over the head with clubs until senseless. They then took a quantity of diamonds to the value of \$10,000 and went away, but were arrested shortly afterward. Mr. Tabuk was still alive, but his skull was most terribly fractured.

A MEMENTO OF OTHER DAYS.—The chief editor of the Wiener *Tageblatt*, Herr Carl Hoffmann, who recently died at Vienna, wore upon the forefinger of his right hand up to the date of his death a singular memento—an iron ring, which some thirty years ago was made for him from the link of a chain which had fettered him as a political prisoner during two long and weary years of imprisonment.

CHEERFUL PROSPECTS.—According to the mint reports, there is in the public treasury, in the banks and in private hands in the United States the sum of \$553,810,148 in gold. If the old mines turn out tolerably this year, and if the new discoveries in the Black Hills region shall be verified, there will be some reason to conclude that the danger of a gold panic has been averted, even if a few millions of dollars more should be shipped to Europe.

NEW GOLD DISCOVERIES.—The Denver *Tribune* of a recent date says: "While the talk is going on about silver, Colorado is quietly preparing to astonish the natives, as well as the gold bugs, by largely augmenting her field of gold. The decline in the market price of silver and the hostility to it as a circulating medium have spurred owners of gold claims to give them special attention, and in all gold sections of the State there is increased activity, combined with enthusiasm. The gold lodes and placers, under careful tests and thorough work, are demonstrating a richness that will make them more profitable than silver mining.

A ROYAL AND FATAL PEARL.—The following incident was related at a recent soiree in the drawing-room of the Duchess Medina de las Torres, maid of honor of the present Queen Regent of Spain, Christina. Among the jewels offered as wedding gifts by King Alfonso to his first bride, Doña Mercedes of Orleans, was a ring ornamented with a magnificent black pearl, itself surrounded with diamonds. Mercedes wore the ring to the last day. After her death Alfonso gave the jewel to his sister, the Infanta del Pilar, who, in her turn, wore it till her death. The ring had thus become twice endeared to the young sovereign on account of the sad remembrances it recalled. He had it on his finger on his death bed. Now the jewel has become the property of Queen Christina. She long hesitated whether or not she would put it on her finger. But, finally, superstition was the strongest, and the ring has been enclosed in a case, from which it will not be drawn out any more, at least for a long while.

YIELD OF DIAMONDS.—The Kimberley *Daily Independent*, in its review of the yield of the diamond mines of South Africa, says that there passed through the post office in Kimberley from 1870 until the end of 1885, by weight 16,642 pounds, or nearly 7½ tons of diamonds, which corresponds to 28,704,000 karats. By assuming the average value per karat to be 30 shillings, we would obtain a total value of £43,056,000. If we add to this the unascertained value of diamonds that have not passed through said post office, we may form an approximate judgment of the value of the "milch cow," as Kimberley is called in vulgar language.

MAGNETIZED CORSET STEELS.—A young woman of Columbus, Ga., about to visit the generating station of the electric light company, was told to leave her watch at home lest it be magnetized by the strong electric current. She did so, but complained afterward that her watch would not keep good time. She sent it to a jeweler, but he reported that it was not magnetized and kept good time. Still, however, when she carried it her time was too slow, although when she left it in her room it ran correctly. A gentleman who knew of the circumstances suggested to the young lady that she wear another pair of corsets when next she carried the watch. She did so, and had no further trouble with it. The steel springs in her corset had been magnetized.

PRIZES OFFERED.—A meeting of watchmakers was lately held in Biel, Switzerland, to devise ways and means for improving the present crisis in the Swiss watch manufacturing. It appears from the minutes that two systems are in vogue there for manufacturing watches, the adherents of which are bitterly arrayed against each other: the factory system and the homework system. Owing to their jealousy, prices have, during the past 15 years, been lowered fully 50 per cent., and in order to prevent another cut in prices, about 600 watch manufacturers, superintendents and workmen met, debating in a friendly spirit the two systems of the watch industry. A committee was appointed to draw up conditions for offering prizes: 1st prize, 150 francs; 2d prize, 100 francs; and 3d prize, 50 francs. Answers to the following questions can be written either in French or German: 1. What are the causes producing the continued sinking of the prices of watches and wages? 2. What are the best means for combatting these evils? The following subjects are to be elucidated specially: *a.* The watch commerce and the credit system. *b.* Foreign competition. *c.* Manufacturer, superintendent and workman. *d.* Government aid in shape of enactment of laws and ordinances. *e.* Advancement of the moral and financial conditions of the workman.

MURDER WILL OUT.—"Nearly all the watches at present found in commerce," says the *Schweizerische Uhrmacher Ztg.*, "bear the inscriptions 8, 12, 13, 15 or 18 jewels—in fact, they may be considered regular ruby mines—even when the set stones (in case the watches are provided with them or contains the indicated number of jewels), are frequently made of material which, as far as concerns quality, that is, hardness, resistance to wear and capable of being polished, have nothing in common with the genuine ruby. These 'jewels' consist for the greater part of colored glass, aquamarine, topaz, pale amethyst, rock crystal, pale Bohemian garnet, pale or red India garnet, chrysolite, etc., and it can boldly be said that neither the purchasers nor wearers, nor yet the vendors or furnishers, are able to judge correctly of the nature and qualities of these 'jewels.' The setting of genuine jewels well worked in watches, however, is of so great an importance that it is fully deserving our serious attention; this jewel setting is for the correct rate of the watch much more important than is generally believed, and is fully as important as the denominations "fine gold," "fine silver," of the case, the dust cap and the bow. We are of the opinion that every watchmaker should engrave upon the movements, cases and covers, the exact number and kind of jewels contained in the watch, and all countries should forbid the importation of watches not bearing this inscription."

Workshop Notes.

TO GRIND GLASS.—A mat surface may be produced on glass by grinding its surface on a wooden wheel set with wet sand.

TO PREVENT RUST.—Iron or steel immersed warm in a solution of carbonate of soda (washing soda) for a few minutes will not rust.

MOLDING COMPOSITION.—Plaster of Paris is made hard enough for molds for metal castings by dissolving ten per cent. of alum in the water used for mixing the plaster.

IMITATION SILVER.—Silver, 1 ounce; nickel, 1 ounce, 11 dwts.; copper, 2 ounces, 9 dwts. Or, silver, 3 ounces; nickel, 1 ounce, 11 dwts.; copper, 2 ounces, 9 dwts.; spelter, 10 dwts.

FRICTION OF PIVOTS.—The friction of pivots in the holes is greater when the pivot's circumference is greater; it is also greater when the mass of the balance is greater. The reciprocating balance spring necessarily causes a stress on the pivots in being coiled up and in its uncoiling.

HARD GOLD ALLOY.—A gold alloy of great hardness, excellently well suited for filling worn out joints and holes, is composed by smelting together three parts gold, two parts silver, four parts copper, and one part palladium. This alloy is of a brownish-red color and assumes a high polish.

TO BRONZE BRASS CASTINGS.—For bronzing brass castings: Dip the articles in a bath of hydrochloric acid, 6 pounds; sulphate of iron, half a pound; white arsenic, half a pound; until black. Then wash in hot water. Dry in sawdust, polish, to suit the taste, with plumbago, brush, and lacquer.

TO SOLDER GERMAN SILVER.—Dissolve granulated zinc in hydrochloric acid in an earthen vessel. Cleanse the parts to be soldered, and apply the acid. Next put a piece of pewter solder on the joint, and apply the blowpipe to it. Melt German silver one part, and zinc, in thin sheets, four parts, then pulverize it for use.

TO POLISH STEEL.—If the steel is of a moderately good temper, use a zinc polisher with diamantine; a tin polisher is better for soft steel. The diamantine should be mixed on glass, using a beater also of glass, with very little watch oil. Diamantine mixed with oil becomes gummy, and is quite unfit for use in a day or two.

SCREWS IN FINE WATCHES.—A broken screw in a fine watch should invariably be replaced by a new one, and its head must not only be polished, but also its thread should be ground. This latter operation is not to be performed in such a manner as to make the surface bright, but to remove every trace of burr from within the thread.

FROSTING SILVER.—To produce a frosted surface upon polished silver use cyanide of potassium with a brush; the silver must not be handled during the process, but be held between pieces of boxwood or lancewood. The proportion to be employed is one ounce of cyanide of potassium to one pint of water. Use diligent caution, however, since the stuff is very poisonous.

TO DRILL PORCELAIN.—It is sometimes necessary to drill one or more holes into porcelain, but the usual way in which it is performed is far from easy. If, however, an ordinary drill is hardened and moistened with oil of turpentine, it will easily penetrate the porcelain. The drill commonly employed in connection with scroll-cutting machinery answers the purpose well.

A NEW ALLOY.—A new alloy, which is specially adapted to many important uses in the arts, has recently been composed. It melts at the low temperature of 160° F., or considerably below that at which the magical spoons of long ago melted in a cup of tea. Its composition is: Bismuth, 48 parts; cadmium, 13 parts; lead, 19 parts; and tin, 30 parts. The alloy will withstand severe pressure.

SOLDERING ALUMINUM.—The soldering of pieces of aluminum to each other or to other metals has hitherto been rather difficult. According to a communication of Mr. Bourbouze, in the *Comptes Rendus*, he has found out that aluminum can be soldered as easily as tinplate with an ordinary soldering iron, if, instead of pure tin, an alloy of five parts of tin with one part of aluminum is used as solder.

ACCELERATION.—The phenomenon of acceleration of a timepiece is still imperfectly understood. New chronometers and watches, instead of steadily gaining or losing a certain number of seconds each day, go faster and faster day after day. There is no certainty as to the amount or ratio of this acceleration, nor as to the period which must elapse before the rate becomes steady, but an increase of a second a month for a year may be taken as the average extent in marine chronometers.

TREATMENT OF A SCREW.—When a screw has been turned sufficiently large in the lathe to receive a perfectly cut thread, it will generally fit tightly in the hole after the thread has been cut in. To prevent this, dip the screw in dilute nitric acid (four parts water to one part acid), and move it about in it, so that it is corroded equally in all parts. The repairer will understand the strength of the acid after one or two trials. The screw must next be ground with oil-stone dust and oil; to do this, take a pegwood, split it in the middle, and place some of the powder and oil in the split; then insert the screw, and turn it with the screw driver, and it will quickly become smooth.

ARTIFICIAL DIAMONDS.—The following formula for preparing strass comes to us highly recommended: Take pure silica, one hundred parts; red oxide of lead, one hundred and fifty parts; calcined potash, thirty parts; calcined borax, ten parts; arsenious acid, one part. This, it is claimed, will produce a paste of great brilliancy and refractive and dispersive powers; besides this, it has a specific gravity nearly like that of the diamond. It fuses at a moderate heat and acquires the greatest brilliancy when remelted and kept for two or three days in a fused state, in order to expel the superabundant alkali and perfect the refining process. This paste is used not only to produce fictitious diamonds, but other imitation gems, of which it forms the basis.

TO MAKE GOLD TOUGH.—When it is desired to produce very tough gold, use as flux a tablespoonful of charcoal, which put into the pot with the mixture of alloy, and one of sal ammoniac, adding to it the gold, when this is at the point of fusing; the sal ammoniac burns away while toughening the gold, leaving the charcoal behind, coating the latter, thus preventing the metal from adhering to the pot. The employment of the mixture of sal ammoniac will bring the ingots of gold up bright and clear; it will also prevent them from splitting or cracking in the rolling mill and in subsequent working; if proper attention has been paid to it, the gold will then be found tough and pliable. This does not, however, apply to every kind of alloy, but it may be affirmed of low karat gold.

UPRIGHTING THE CENTER WHEEL.—The holes in the bouchons of the plate and bridge are left a little smaller than is required by the pivots. After centering the plate in the Universal lathe (with its centering center), the bushing is turned flat on the inner side, and then again inspected with the pump center whether the hole coincides exactly with the center of the clamp head, and trifling differences are entirely corrected by slight taps with a wooden mallet upon the edge of the plate. When, by doing this, we are fully convinced that the hole stands at the right place, we turn it open with a thin graver (a chuck graver is best for this purpose) until the pivot almost fits into it. Then, without taking the plate out from the lathe, screw on the bridge, which has already been provided with a bouchon, and open its hole similar to the first. Beginners must be careful to have the graver very sharp, as a dull one simply scrapes but does not cut.

Trade Gossip.

The publication office of this paper has removed from 42 Nassau street to 189 Broadway, where all communications should be addressed hereafter.

J. Seaman succeeds W. J. Weber, Vandalia, Ills.
 D. De S. Mendes arrived from Europe May 10th.
 S. F. Kaufman succeeds F. K. Crane, Attica, Ohio.
 H. A. Bird succeeds W. N. D. Bird, Emporia, Kan.
 Kerr & Walker succeed J. F. Walker, Richmond, O.
 W. B. Graver succeeds J. V. Ridgeway, Denver, Col.
 Willett & Rankin succeed L. D. Willett, Olathe, Kan.
 N. B. Levy & Bro. succeed N. B. Levy, Scranton, Pa.
 C. D. Smith has moved from Akron to Gowanda, N. Y.
 K. Silsbee has moved from Hastings to Freeport, Mich.
 Dolliver Bros. succeed F. W. Tibbetts, Gloucester, Mass.
 W. C. Steell has moved from Gellatin to Nashville, Tenn.
 H. D. Randall succeeds M. O. Randall, Brockport, N. Y.
 G. R. Coe has moved from Boonton, N. J., to Easton, Pa.
 E. A. Chapman has moved from Viola to Cambridge, Ills.
 J. H. Richardson succeeds G. C. Muir, Mount Ayr, Iowa.
 O. L. Hulberg succeeds L. W. Johnson, Farmington, Minn.
 M. J. Griswold has moved from Clarksville to Sheridan, Mich.
 F. Petz & Co. succeed the firm of F. & J. Petz, Detroit, Mich.
 Frank Jarboe has moved from Sauk Center to Brainerd, Minn.
 W. H. Langford succeeds W. W. Livingston, Susquehanna, Pa.
 F. A. Colburn succeeds the firm of Colburn & Fiske, Canton, N.Y.
 J. W. Barber has moved from Mineral Wells, Texas, to Ruston, La.
 C. A. Clements has moved from Prescott, Ark., to Springfield, Mo.
 Butler & Schneider, Clarinda, Iowa, are reported to be closing out.
 W. W. Wing has purchased the business of E. R. Pierce, Augusta, Me.
 E. G. Sherman has moved from Wentzville to Montgomery City, Mo.
 Fred. Kurz has purchased the business of J. W. Minner, Sparta, Ills.
 Charles Tucker has moved from Del Norte, Col., to San Diego, Cal.
 John Dewey succeeds the firm of Dewey & Miller, Milwaukee, Wis.
 P. P. Taylor succeeds the firm of Taylor Bros., Fort Atkinson, Wis.
 M. C. Doolittle has moved from Humestown, Iowa, to Wymore, Neb.
 W. M. Mantz has moved from North English, Iowa, to Grafton, Neb.
 C. F. Lotze succeeds the firm of Bridgeman & Lotze, Vermillion, Dak.
 Swift & Crain succeed the firm of Tarbell & Swift, Marathon, N. Y.
 John M. Chute has moved from Deckerville to North Branch, Mich.
 H. L. Chase has purchased the business of E. E. Teape, Rockford, Iowa.
 George A. Bailey has moved from West Brookfield to Southbridge, Mass.
 Mr. J. H. Kimball has removed from 682 Broadway to 14 Maiden Lane.

Wm. H. Weld has moved from Lockport, N. Y., to Minneapolis, Minn.

C. H. Warriner succeeds the firm of Cash & Warriner, New Lisbon, Wis.

Rand & Crane succeed the firm of C. W. Kennard & Co., Boston, Mass.

Boothby & Judy succeed the firm of Abraham & Frank, Coffeeville, Kan.

E. A. Potter & Co. succeed the firm of Potter & Hodges, Attleboro, Mass.

Mr. H. B. Potthoff, late of Carrolltown, Pa., has removed to Latrobe, Pa.

W. A. Nelson has purchased the business of L. H. Kimball, Neenah, Wis.

W. B. Cubberley succeeds the firm of Cubberley & Donley, Seward, Neb.

Hartford Silver Plate Co., have removed their New York office to 257 Broadway.

C. W. Frodsham succeeds the firm of W. Frodsham & Son, Savannah, Mo.

B. L. Robbins has purchased the business of Gardner Bros., Newton Falls, Ohio.

Wimpfheimer & Zeckendorf have removed from 28 Center street to 174 William street.

F. L. Paul has purchased the jewelry department of Paul & Veeder, Paullina, Iowa.

M. A. Rose has purchased the business of Charles Bourgardus, Colfax, Washington Ter.

Mr. R. A. Breidenbach has removed his Providence office from 109 to 94 Friendship street.

The firm of Stilson & Rounds, Annistown, Ala., has been dissolved. F. S. Rounds will continue the business.

The firm of C. L. & C. H. Perkins, of Norwich, Conn., has been dissolved. C. L. Perkins will continue the business.

J. G. Cheever & Co. will put on the market, stamped with their trade mark, a very elegant line of fine rolled plate chains for fall season.

The silver plated ware for the Tuxedo Club, Tuxedo Park, Orange County, N. Y., was made in special designs by the Meriden Britannia Company.

The Geneva Optical Company, of Geneva, N. Y., have established a western branch of their business at 46 and 48 Madison street, Chicago.

Floyd, Pratt & Rounds have moved from Providence to 408 Washington street, Boston, where they will continue the business as jobbers in jewelry.

Mr. George B. Osborne, formerly with Arthur, Rumrill & Co., has engaged with William Smith & Co., and will travel East and South for that firm.

N. B. Nickerson & Co. are making a very attractive and popular line of lace pins, silver collar buttons and drops; also a full line of flat goods in novelties, etc.

A New Haven bootblack recently picked up in the street a \$500 diamond, which is now in the possession of General George H. Ford, who is striving to find an owner for it.

Mr. Edward S. Smith, of the firm of Smith & Knapp, recently returned from an extended trip through the West, and reports the state of trade in a fairly encouraging condition.

Among the city removals during the past month were the following: M. B. Bryant & Co. to No. 10 Maiden Lane, K. Radler to 19 John street, Geo. A. Eaton & Co. to 196 Broadway.

The business of Stanley & Camp, Milwaukee, Wis., has been incorporated as a stock company, and the business will be continued under the style of The Stanley & Camp Jewelry Co.

The firm of Wilson & Helderman, Monroe City, Ind., has been dissolved. A. N. Helderman will continue the business. H. W. Wilson has moved to Edwardsport and gone into business.

Potter, Read & Co. succeed B. L. Hall & Co., of Providence, as manufacturing jewelers. B. L. Hall has arranged with Godfrey & Adams for the manufacture of their Automatic sleeve button.

Louis Strasburger & Co. have sold their entire watch business to Mr. Byron L. Strasburger, and will hereafter give their entire attention to the diamond business, which they will develop on a much larger scale.

Cooke & Eddy, who have met with great success from the introduction of their sleeve button, will introduce this month an improvement to it which, it is claimed, will make a button superior to any other in the market.

The firm of Nichols, Black & Co., of Providence, having been dissolved by mutual consent, is succeeded by the new firm of Clarke, Black & Co., which consists of Geo. L. Clarke, Jas. B. Black and Prescott O. Clarke.

Montreal dealers have recently been swindled by a man and woman, who called on various ones to look at goods and succeeded in each instance in getting away with several hundred dollars worth. They were not captured.

Healy Brothers have introduced an anti-pickpocket swivel which will be found illustrated in their advertisement. It sends out several sharp prongs to prick the hand of him who attempts to meddle with a watch that does not belong to him.

The Kossuth Marx Jewelry Company, limited, enter upon business June 1. The persons formerly identified with the firm of Kossuth Marx & Co. will conduct the new enterprise. Their place of business will be at 39 Maiden Lane.

The Knights of Labor at Hartford undertook to prevent T. Steele & Son from selling certain goods of which they disapproved, but were informed that the firm was competent to manage its own affairs. This was an attempt at boycotting that did not succeed.

Mr. R. J. F. Roehm, of Detroit, accompanied by his wife, sailed for Europe by the steamer *Servia* May 1. Mr. Roehm will be absent until fall, during which time an elegant new store will be erected for him in Detroit, and be ready for occupancy by the time he returns.

Mr. J. Hammerschlag, of Falkenau, Oppenheimer & Co., sailed for Europe on the steamship *Aller* on the 8th ulto. Mr. D. E. Oppenheimer, the resident partner of the same firm in Europe will pay a short visit to this country, arriving here in the early part of June.

Sampliner, Adler & Co., made an offer in settlement of their indebtedness of 25 cents on the dollar, payable by notes at three, six and nine months, the notes bearing 6 per cent. interest. The New York creditors rejected the offer, but those of Providence agreed to accept it.

J. T. Scott & Co. have been appointed sole agents for the Auburn-dale horse timer, and are now prepared to fill orders for either the jobbing or retail trade. This timer is claimed to be unexcelled for accuracy by any timer in the market. They have also in stock a full line of Swiss and American chronographs in gold, silver and nickel.

Messrs. T. M. Avery, of the Elgin Nat. Watch Co., C. D. Rood, of the Hampden Watch Co., Jacob Bunn, Jr., and A. E. Bentley, of the Illinois Watch Co., C. N. Thorpe and Simon Muhr, Phila., Chas. H. Duhme, Cincinnati, C. P. Tafft, of the Blauer Watch Case Co., Chicago, and C. F. Morrill, of the Bay State Watch Case Co., Boston, were in New York during the past month attending the meeting of the Manufacturers' Association.

Mr. Jules Oppert, the Oriental savant, communicated to a recent meeting of one of the sections of the Institute of France the discovery in Egypt of an ancient MS., in which mention is made of Jacob and Joseph. Should this MS. be authentic, it will have an uncommonly great significance as testimony in favor of the truth of the Bible.

A preliminary meeting of retail jewelers of this city was held at the Astor House recently, for the purpose of organizing a protective association. It was proposed to hold a mass meeting of jewelers and watchmakers at an early day, and the committee on organization was made up of gentlemen from New York, Brooklyn, Jersey City and Newark.

The Leroy W. Fairchild Company have removed to No. 189 Broadway, where elegant offices have been fitted up for their occupancy. This enterprising house, pioneers in the manufacture of gold pens, pencils, watch charms and an endless variety of fancy goods, constantly present something new and novel in their line to the attention of the trade.

A Texas jeweler hung a watch in his window and labeled it: "Look at this watch for \$10," and the unsophisticated gentleman from Africa who stared at the article and then went in and wanted the \$10, had to get down on the floor with the jeweler and roll over and under him a number of times before he could be made to understand that he couldn't have any \$10.

Keller & Untermeyer have secured an injunction against the New York Gold Watch Case Co., for an infringement on their patents. The decision of the court will be found on one of our advertising pages. Messrs Keller & Untermeyer are to be congratulated on their success in this matter, and it is hoped that all other patentees whose rights are infringed upon will go and do likewise.

Israel Farjeon, a jobber in materials, doing business under the name of Israel Farjeon & Co., at 25 John street, made an assignment to Arthur Saunders, May 11. His liabilities were estimated at \$20,000, and his assets, consisting largely of book accounts and stock that had been considerably damaged, were placed at \$12,000, but it was not believed that they would realize this sum by a considerable.

Hamilton & Hamilton, Jr., manufacturers of rolled plate chains, have adopted trade marks for their different qualities of chain. One quality is marked "* H. & H.," and the other "* H. & H. H." An illustration of these marks will be found in our advertising pages. These goods are so popular in the trade that the firm is compelled to adopt a trade mark to prevent the trade being imposed upon by imitations of their productions.

Hancock, Becker & Co., will show the trade for the coming season a very large and well assorted stock of the best rolled plate goods, consisting of lace, cuff and misses' pins, drops, screw nibs, scarf pins, brooches, etc. These goods are mounted with their new patent diamond setting, an imitation of a solid gold hand made mounting, polished both inside and out, and set with diamond cut brilliants, Brazilian pebbles, Siberian rubies and their celebrated black diamond.

Old Sexton Brown, the once famous sexton of Grace Church, used to show his friends an epitaph which he copied from a tombstone in Wales as one of the rarest curiosities of churchyard literature: "Here lies in a horizontal position the outside case of George Rutleigh, watchmaker, whose abilities in that line were an honor to his profession. Integrity was the mainspring and prudence the regulator of all the actions of his life. Humane, honest and industrious, his hands never stopped until they had relieved distress. He had the art of disposing of his time in such a way that he never went wrong except when set a-going by persons who did not know his key, and even then was easily set right again. He departed this life November 7, 1811, wound up in the hope of being taken in hand by his Maker, thoroughly cleaned, regulated and repaired and set a-going in the world to come."

A Syracuse peddler named S. L. Goldstein, who sold many goods through Northern New York and New England, recently ordered liberally from Boston dealers and absconded to Canada with the goods. He was arrested in Montreal by customs officers, charged with smuggling, but escaped by proving that the goods belonged to his brother-in-law named Myers, who is a dealer there. Neither the Boston dealers nor the Canadian officers succeeded in getting possession of the goods.

H. Muh's Sons, having recently vacated their large workshop on Chestnut street, Philadelphia, where they had carried on the manufacturing business for six years, were offered \$5,000 for the old floor. This offer was declined, and they had the dirt gathered and put in jars, the floor taken up, and the whole sent to W. L. Glorieux, of Newark, with instructions to refine and return the gold. If the "rubbish" was worth \$5,000 to a speculator, it will probably yield at least as much to the firm owning it.

Mr. L. M. Barnes, on the first of May, celebrated the 20th anniversary of his entering into business at North Adams, Mass. In 1866 he, in company with A. H. Sanford, established a jewelry store in North Adams, and conducted a successful business; in 1884 Mr. Barnes bought out his partner, and has continued the business alone since then. Mr. Charles W. Hinman has been connected with the repair department of the firm since 1866, and a very large business in this line has been done under his direction.

Reports received by Bradstreet's regarding the strikes show that between April 24 and May 14 the number of strikers was 250,000; on May 20 the number was reduced to less than 50,000. The losses entailed by the strike are estimated as follows: Loss of wages, \$2,802,000; loss of current business, \$2,105,000; new business stopped, \$24,800,000; say \$30,000,000 as the cost of the unreasonable demands of the Knights of Labor. In this estimate the value of property destroyed and lives sacrificed finds no place.

Mr. Louis C. Bernays, a well known jeweler of Little Rock, Arkansas, made an assignment May 10, to E. C. Arnold, who has been in his employ for several years. His liabilities were estimated at \$40,000, of which \$9,500 was to preferred creditors. Subsequently one of the creditors commenced chancery proceedings for the appointment of a receiver, enjoining the assignee and the attaching creditors. The court appointed Mr. E. J. Butler as receiver, who gave bonds in \$30,000. Mr. Bernays' assets were figured at \$29,550.

Two shoplifters from Boston, named Nellie Byron and Minnie Stanley, were recently arrested in this city by detectives from Boston. They are charged with having stolen a \$1,300 diamond ring from the store of Shreve, Crump & Lowe, while on a shopping excursion, substituting a paste diamond for it. From Palmer, Batchelder & Co., they secured a diamond horse shoe valued at \$600. At the Tremont House they were registered as "Mrs. Byron and Miss Holman, Newark, N. J." After obtaining their plunder they came to this city where they pawned the \$1,300 ring for \$250. When captured and taken to the police court, they consented to return to Boston without trouble.

William R. Morris, a workman in the employ of Day & Clark, in Newark, was recently arrested charged with stealing scrap gold from the benches of his fellow workmen. Scrap had been missed for a long time, and various workmen had been suspected. Morris was detected through offering a nugget worth \$25 to a jeweler for \$10. On searching the rooms occupied by him, there were found a melting pot and some jewelry belonging to Day & Clark. It appeared as though others were associated with Morris and made his rooms their headquarters. The prisoner made no denial of his guilt and was held for trial. Morris was recently married to a young woman who took his arrest very hard.

A very plausible swindler who had succeeded in defrauding several Philadelphia firms out of valuable goods, was arrested in Wheeling early last month on a telephone order from Pittsburg. He gave his name as C. C. Wilson, but in Philadelphia he represented himself to be Mr. Kinnane, of the firm of Kinnane, Wren & Co., of Springfield, Ohio, and bought goods in their name. When arrested he had four trunks filled with various kinds of merchandise, one of them containing a large amount of jewelry. He claimed to be a traveler for eastern jewelry houses but declined to give their names. He is described as a tall, fine looking man with a black moustache.

Mr. A. A. Webster, formerly of the firm of E. G. Webster & Bro., and R. W. White, Jr., have formed a co-partnership and leased the store formerly occupied by the Meriden Silver Plate Company, 30 East 14th street. The new firm are the New York agents of the Meriden Silver Plate Company, and also of the Towle Manufacturing Co., manufacturers of solid silver flat ware. Both members of the new firm are well known in the trade, Mr. White having been connected with the Meriden Silver Plate Company as their New York representative, while Mr. Webster, as a member of the firm of E. G. Webster & Bro., has also had an extensive experience with the class of goods they will handle in future.

We clip the following from a daily paper as of more or less interest to jewelers: "Beauty and charm of general effect is so large an item of the stock in trade of an actress, that she, of all women, is the first to appreciate and adopt anything which will enhance her personal appearance. When one of our eminent popular favorites discovered that she could have her pendant brilliants hung on a pivot, and that they would flash incessantly in every direction and be visible in every portion of the theatre so long as she remained before the footlights, greatly increasing their apparent size, old-fashioned settings received a hard blow, and the pivot settings for diamonds became a recognized accessory of the stage."

While making the excavations for a sewer on 35th street, between 7th avenue and Broadway, New York city, the workmen recently uncovered a large garnet which was enclosed in the gneiss about nine feet below the level of the street. The crystal was a well defined trapezohedron, having its angles truncated and beveled by the rhombic dodecahedron and hexakisoctahedron, a combination quite characteristic of the garnet. The crystal had been a little mutilated by the workmen, but all of the upper octons were very well developed, and the lower ones for about half their distance. The owner of the mineral, Mr. J. J. King, determined its total weight, including a little quartz and serpentine attached to the lower portions, to be nine and a half pounds. The horizontal axes were six inches. The exterior of the crystal was slightly weathered, but a fresh fracture showed a fine red color.

B. & W. B. Smith, manufacturers of artistic store fixtures, present in this number an illustration of the interior of the Pairpoint Manufacturing Company's store in Maiden Lane. The Messrs. Smith stand without a rival in the art of finishing and decorating interiors, as their work can testify. Among the many establishments in New York fitted up by them are the following: Gorham Manufacturing Co., Waltham Watch Co., Theodore B. Starr, Park & Tilford, Roger Peet & Co., Mitchell, Vance & Co., Amasa Lyon, Macy & Co., Jacques & Marcus, Caswell & Massey, Rogers & Bro., William Moir, Robert Dunlap & Co., Howard & Co.; M. S. Smith & Co., Detroit, Mich.; M. Scooler, New Orleans; Bigelow, Kennard & Co., Boston; Harris & Shafer, Washington, D. C.; C. L. Byrd & Co., Memphis, Tenn.; Tilden, Thurber & Co., Providence, R. I.; Cowell & Hubbard, Cleveland, O.; C. Hellebush, Cincinnati, O.; W. S. Justis & Son, Baltimore, Md. Their work is of the best class and never fails to give satisfaction.

Since our May issue the following named gentlemen have sailed for Europe: Messrs. Paul Juergens, of Juergens & Anderson, Chicago; S. H. Levy, of L. & M. Kahn & Co.; Thomas LeBoutillier, Charles Kuhn, of Kuhn, Doerflinger & Co.; J. F. Fradley, all sailed on the steamer *Umbria* May 8; J. J. Cohn sailed by the *Fulda* May 12; H. C. Wilcox, President of the Meriden Britannia Co., sailed by the *Adriatic* May 13; Byron L. Strasburger and Theodore B. Starr sailed by the *Aurania* May 15; F. L. Mart n with Samuel Eichberg sailed by the *City of Rome* May 26; P. A. Leimbach sailed by the *State of Georgia* May 20.

In August, 1884, the arrival of the celebrated 457 karat fine white diamond from South Africa, and its subsequent purchase by a syndicate of London and Paris diamond merchants were announced. The gem was intrusted to the care of one of the most skillful cutters who has been engaged on the stone during the past eight months, and expects to complete the work in April next. As anticipated, the stone will turn out the most wonderful "brilliant cut" diamond on record, surpassing in weight, as also, it is believed, in color, purity and luster, all the crown and historical brilliants of the world. The stone in its almost finished state weighs still 230 karats, but in order to give it the best possible shape and luster, it is intended to reduce its weight to something under 200 karats. The Koh-i-noor weighs only 106 karats, the Regent of France 136 $\frac{3}{4}$ karats, Star of the South 125 karats, and the Piggott 82 $\frac{1}{4}$ karats. The Great Mogul weighs 279 karats. It is, however, a lumpy stone, only rose-cut, and if cut to a proper shaped brilliant it would probably not weigh more than 140 karats.

The citizens of Newport, Ky., are becoming alive to the importance of retaining among them the Dueber Watch Case Company's works, now that their removal is threatened and other cities bidding high to secure them. On May 14 an elegant banquet was tendered Mr. John C. Dueber by citizens, at the residence of Senator Barry Taylor, Mr. Taylor presiding. The grounds surrounding the mansion were illuminated with lanterns, and upon the arrival of the guest of the evening, there burst in brilliant colors from a stand of fireworks, "In honor of John C. Dueber." The designs in flowers placed on the banquet tables were masterpieces of the florist's art. A Dueber watch case of bright yellow immortelles laid on a jewel casket composed of roses, pansies and carnations mingled with maiden hair fern; two other large designs represented Mr. Dueber's trade marks, the shield and anchor, and an anchor entwined with a serpent. The speeches of the evening were extremely complimentary to the enterprise and business energy of the guest, and a full recognition of the fact that this is one of the most important industries in that section. The sentiment was freely expressed that Newport should continue to be the home of the Dueber works.

Mr. F. H. Kuhns, jeweler, of Sharpsburg, has on exhibition in his window one of the oldest watches in the United States. There is one owned by a man in Boston that is older, but the works are worn out, while this one still keeps very good time, not varying more than a minute in twenty-four hours. The date of its manufacture is inscribed on the inside case and shows that it was made in 1677. It is a cylinder escapement movement and is evidently one of the first of that style ever made. It was made fifty years before the lever movement, now generally used, was invented. It is eighteen karat gold and has been carried so long that the bow to which the guard is attached is worn as thin as a thread. The figures on the dial plate are the simple 1, 2, 3, etc. There is no second hand and the instructions are engraved on the inner case telling how to wind the watch. This old relic is the property of Mr. David Gray, of Pittsburg, and was obtained by him from an old lady in Ireland some twenty years ago. It had been an heirloom in the lady's family for centuries. Mr. Gray values the timepiece very highly, having refused some very tempting offers for it. The escape wheel in the watch is made of brass which would indicate its great age, as steel has been the metal used for many years past.

According to the Moslem creed, the reason why every Moham- medan lady considers it her duty to wear ear rings, is attributable to the following curious legend: Sarah, tradition tells us, was so jealous of the preference shown by Abraham for Hagar, that she took a solemn vow that she would give herself no rest until she had mutilated the fair face of her hated rival and bondmaid. Abraham, who had knowledge of his wife's intention, did his utmost to pacify his embittered spouse, but long in vain. At length, however, she relented, and decided to forego her plan of revenge. But how was she to fulfill the terms of the vow she had entered into? After mature reflection she saw her way out of the difficulty. Instead of disfiguring the lovely features of her bondmaid, she contented herself with boring a hole in each of the rosy lobes of her ears. The legend does not inform us whether Abraham afterward felt it incumbent upon him to mitigate the smart of these little wounds by the gift of a costly pair of ear rings, or whether Hagar procured the trinkets for herself. The fact remains, however, that the Turkish women, all of whom wear ear rings from their seventh year, derive the use of these jewels from Hagar, who is held in veneration as the mother of Ishmael, the founder of their race.

Mr. S. H. Hale, who has been identified with the American Watch Company for some twenty years, first as salesman in the office in this city, then as general agent for the West, with headquarters in Chicago, but more recently having charge of the sales department in New York, has resigned his position and will retire from the service of the company July 1. Mr. Hale's health has not been good for some time, and he prefers to return to the West where the climate agrees with him better. He will identify himself with his brother, William Hale, the well known manufacturer of elevators for buildings, whose business not only extends all over this country but throughout Europe. The company of which William Hale is the president and largest owner, controls the patents on hydraulic elevators and also succeeded to the well known Otis steam elevator patents. Another brother, George, represents the company in Europe. Efforts have frequently been made to induce S. H. Hale to join the company on account of his excellent business qualifications and executive ability, but it was not until his health became precarious that he would consent to the change. He will remove to Chicago at an early day, and, doubtless, have charge of the elevator business in the West. His many friends wish him abundant success in his new field of enterprise.

The Duke of Wellington was extremely fond of watches, and needed to have at least half a dozen within reach and all ticking their liveliest at once, and this is but half the story. Fearing some ill might befall those just under his eye, orders were given whenever the great man traveled to have as many more stowed away in a portmanteau made to fit his carriage. One timepiece was, above all others, his acknowledged favorite; it was of old-fashioned English construction, and had once been the property of Tippoo Sahib. Another of the Duke's treasures had a strange history. Napoleon had ordered it of Breguet for the fob of his brother Joseph, and as an extra courtesy, directed a miniature map of Spain to be wrought in niello on one side, and the imperial and royal arms on the other. Just as this lovely gift was finished, Joseph was driven out of his kingdom by the Duke, and the Emperor, for reasons best known to himself, refused to take or pay for the costly Lauble. At the peace it was purchased from Breguet and presented by Sir E. Paget to the Duke of Wellington. Another watch owned by the Duke was made for Marshal Junot, and a great horological curiosity it is. There has never been more than two others like it. They are constructed to mark both lunar and weekly movements. The great Duke gave preference to certain *montres de touche*—and he had several of them—a contrivance of Breguet's, having sundry studs or knobs by which one could feel what hour it was, and this merely by what seemed "just fumbling in his pocket."



THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 189 Broadway, New York.

Advertising rates made known on application.

Trade Prospects Improving.

THE PROSPECTS of a prosperous spring trade that were so bright in the early part of the year were destroyed by the labor troubles that spread through the country like an epidemic. The demands of the workingmen, however, were so unreasonable in many instances, and were generally prosecuted by methods so repugnant to American ideas of individual liberty and fair play that they defeated themselves. But the excitement had to run its course, and at this writing it has virtually ceased, ending in the almost uniform defeat of the workingmen, a great majority of whom have been glad to return to work on the same terms they had before striking. The cessation of hostilities between employers and their employees has done much to restore confidence in the future of business in general. While the mischief accomplished cannot be undone, nor the trade that was lost be restored, yet the fact that workingmen are once more amenable to reason and willing to resume their occupations, gives hope that better times may be anticipated for the fall and winter trade. If all the conditions were favorable this spring they are even more so now, for all that then gave promise still exist, and we have the additional fact that the crops have been bountiful, so far as harvested, and that the outlook for the remainder is most favorable. There is also a further subject for congratulation in the fact that Congress is near the close of the session instead of at the beginning, and that there can be no tampering with the tariff, or discussions of other propositions calculated to disturb business and destroy confidence. Many of the large manufacturing industries that were closed

during the labor agitation have resumed operations, and report that the demand for their products was only suspended, not destroyed. The strikes did not invade the jewelry trade to any great extent, and it was only affected through sympathy with business in general. That, however, was sufficient to bring dullness where activity had been anticipated. But trade ought to be good this fall; money is plentiful, goods are elegant, dealers have reduced their liabilities and their stocks have been greatly depleted, so that when they feel that the time has arrived when they can do so with safety they are likely to order liberally. July and August will, no doubt, be as dull as usual, but September should bring greater activity, growing gradually into something of a business boom before the holidays.

While the complaint has been general of dull times during the summer thus far, there are those who have found orders brisk enough to content them. These are they who have some good taking novelties, for which the demand is permanent and fairly regular. We might say that necessary novelties have a steady and continuous sale. There are certain goods that are necessary articles of toilet for gentlemen and ladies, and those dealers who are ingenious enough to get these up in novel and attractive forms, have little cause to complain of hard times. For instance, cuff and collar buttons, scarf pins and shirt studs are articles necessary to the toilet of a gentleman, while lace pins, collar pins, bracelets and quite a variety of other specimens of gold goods are necessary to the daily adornment and comfort of the ladies. Other articles, more in the nature of luxuries, are indulged in by both sexes according to their individual tastes and means. But everybody wants novelties even in necessary articles, and especially so in all articles of luxury, so that those manufacturers who have the happy faculty of hitting the public taste in these matters have a good thing of it, and little cause to complain of dullness. Of course, the more frequently they can change the styles the better for them, and hence the necessity for employing designers possessed of good taste and originality. In standard goods, too, new forms and designs are demanded, so that manufacturers are forced to be progressive and anticipate the wants of the public. He who does this the most completely reaps his reward of quick sales and a demand for goods that knows little dullness and no holidays. Should there come a revival of business this fall, as so many now predict, the trade will be found fully prepared to meet it.

The Independence of Skilled Workmen.

THE MAN who is master of a good trade is also master of his fortune. At least, this is true if he has the manhood to preserve his independence, and not pledge himself, body and soul, to some trade organization controlled by reckless and irresponsible leaders, who have nothing to lose by trade disturbances but everything to gain. We believe in trade unionism of that kind that seeks

the improvement, socially, intellectually and pecuniary, of its members, where all questions of interest to the trade are discussed openly, and any action taken is done by the will of the majority. But no workingman can study the events of the late strikes, and the disturbances of the public peace that accompanied them, without being convinced that the organizations that ordered them are not conducted in the interests of the workingmen, but, on the contrary, are calculated to foster enmity between employers and employes that should not exist, and to impress the public with the idea that the mechanics and laboring men of the country do not know their own minds, but are ready at any moment to set the laws at defiance and encourage a reign of anarchy and bloodshed. We know that such is not the case and that no more law-abiding citizens can be found than are the great majority of those who fill our workshops and factories. Most of them are men of families, who seek by their labor, fostered by sobriety and frugality, to educate their children, give them comfortable homes and fit them for responsible stations in life. Unfortunately for this class, the labor organizations of which they are members are not controlled by men of kindred responsibilities, but by hot-headed, impetuous men, who have more the "gift of gab" than expertness with the tools of their trade, and who attain to positions of prominence in the order because they are talkers. These men usually contrive to live upon the treasury of the order, and their perquisites are always largest when there is trouble afoot. They rule the union with an arbitrary hand, and the majority is often overruled by the superior tactics of the few reckless ones.

It is seldom that the arbitrary character of labor organizations has been so conspicuously illustrated as in the Third avenue strikes in this city this spring, covering a period of two months. The first strike was for \$2 a day for twelve hours' work; this demand the public recognized as just and reasonable, and sympathy with the strikers was general. Because of this they carried their point, and the other roads were soon forced to accord the same terms to their employees; one road alone held out, and to compel this to yield a "tie-up" of all the roads was ordered. This, the public felt, was going too far, and it was loudly protested against. The matter was finally arranged satisfactorily and the men resumed work. Then the Third avenue men struck again, demanding that seven employees who did not belong to their association should be discharged. The managers of the road absolutely refused to yield their right to select their employees, and immediately began employing non-union men. The strikers resorted to intimidation, assaulting the new men whenever they found the opportunity, but the arrest and imprisonment of a few of the disorderly ones put a stop to this kind of fun. In a short time the Third avenue cars were manned entirely with new men, and the business was transacted as smoothly as though no strike existed. But the strikers were led by their leaders to believe that there was still hope that the managers of the road would yield to them, and as the drivers and conductors on all lines in New York and Brooklyn were assessed \$2 a week for the support of the strikers, the latter seemed willing to "fight it out on that line if it took all summer." But after about six weeks of this, the men who were working grew tired of supporting several thousand men in idleness, especially as there were complaints that the committee having charge of the funds were appropriating the greater part of the contributions to their own uses, so they gave them one week in which to devise means to make the strike a success or declare it off. Before the week was up the Executive Committee of the association held a secret meeting, and, unknown to and without the consent of the men interested, ordered another "tie-up" of all the roads in New York and Brooklyn. Blindly, without any cause of complaint and against their own convictions of right, the sworn members of the association obeyed orders, refusing to run their cars on any road. Few knew why they had been ordered to quit work, fewer still wanted to quit, yet they obeyed implicitly the orders of men who had not dared to let the question be openly discussed, but issued their orders in secret. Every road except the Third avenue was tied up, but on that road

the new men were true to their employers, as the employers had been to them. As a result, the discontent of the men made the strike a failure, and finding that the roads had little difficulty in securing new men, the old hands hastened to secure their old positions, and in twenty-four hours every road was running again in spite of the orders of the Executive Committee. A greater outrage than this was never perpetrated by any despot, nor did ten thousand men ever commit a greater piece of folly than did those who obeyed the order to "tie-up." The public felt deeply outraged, and the men themselves shared this feeling when they came to learn why they were ordered to strike. The leaders said they were afraid that because the Third avenue strike had proven a failure, the managers of the roads might think their organization had lost its power, so a "tie-up" was ordered to show them that the men would still obey orders. But in their zeal they proved too much, for they disgusted their own members and so demoralized their association that it will probably be impossible for it ever to recover.

We have cited this strike simply to show how utterly regardless of the best interests of the members the leaders in these organizations are. The street car strikes were no more outrageous than were those on the Western railroads, or of the shoemakers of Lynn, or of the hatters of New Jersey, or the employees of the Derby Silver Plate Company; they were all conducted in the most arbitrary manner, and generally in opposition to the wishes of the majority of those interested, and who had to bear the greater portion of the burden. It is usually the fault of all labor organizations that many of the members look upon them simply as a means for forcing employers to pay more wages, or to make some concession that will be of profit to the men. Usually the only way proposed to settle an alleged grievance is to strike, regardless of the number of persons that may be injured in consequence, directly or indirectly. The leaders rely upon brute force to accomplish the end sought rather than upon intelligence. In nine cases out of ten, where they have a real grievance, it can be redressed by quietly and intelligently presenting the matter to the employers, who, being human, will concede more to intelligent reasoning than they will to threats or actual intimidation. It is surprising that in these days of enlightenment, the men who have intelligence enough to become skilled workmen at any trade, should surrender their manhood and independence into the keeping of the few who constitute the officers of trade organizations. It is claimed that the Knights of Labor number nearly a million members who are representatives of all trades and callings, and who are bound by an oath to obey the orders of the Executive Committee. If these say to the thousands of employees of a railroad, "You must strike," strike they will, though they know no reason why they should. Such an organization is a constant menace to the good of society, to law and order, and makes of the intelligent workmen of America the veriest slaves. This subject is one that every workingman should ponder over, and, after intelligent consideration, he should decide whether it is possible for such an association to be of sufficient benefit to him to warrant him in surrendering to it his individual rights, his manhood and his independence, and hold himself in readiness to obey its orders, even though by doing so he brings distress upon himself and his family. Such an association is not necessary in this country, and is opposed to all our free institutions, which are designed to give to the individual the greatest liberty possible, including the right to do what he pleases, within the law, with his labor.

The New York Retail Dealers' Protective Association.



THE ORGANIZATION of retail dealers for mutual protection having been a good deal of a hobby with us for many years, it is with pleasure that we note that the retail dealers of New York have taken steps to perfect such an organization. THE CIRCULAR is

in constant receipt of letters from dealers complaining of certain abuses in the trade, and we have not been able to see any way for them to obtain redress except through associated effort. Manufacturers and jobbers may defy an individual dealer, or a dozen of them if they are scattered and not working in harmony, but an aggregation of them is sure to command respect. Hence, we have persistently advocated the organization of the retail dealers in every city and town where there is two or more of them. United action will accomplish what individual grumbling will often only aggravate. A preliminary meeting of jewelers having determined that it was policy to form a retail dealers' association, a call was issued for a meeting of those who favored it, to take place May 27. The meeting was held, but too late in the month to permit us to report its proceedings in our June issue. The organization was perfected by the adoption of by-laws and the election of officers, whose names will be found in our news columns. The platform of the association may be stated in brief to be a determination to cease doing business with those manufacturers and jobbers who are guilty of the abuses complained of, chief of which is selling goods at retail. This is a practice so generally indulged in by those who should do only a wholesale business that only heroic measures will suffice to put a stop to it. Right here it will not be out of place to relate a true incident that occurred in the Lane recently.

Mr. Jones is a wholesale dealer, but does not disguise the fact that he occasionally sells an article to a friend at retail. Mr. Smith, a retail dealer in a near-by city, looked in on Jones a few days since, and said: "Mr. Jones, I have made up my mind not to buy any more goods of you."

"I am sorry to hear that," replied Jones, "and I would like to know your reason."

"Well, I am told that you sell goods at retail, and I have determined not to buy of any wholesale dealer who does so," was the reply.

"Then you are not going to buy goods in New York any more, are you?"

"Oh, yes; I'm going to buy of Robinson & Johnson; they never sell at retail."

"Who told you so?" said Jones.

"Robinson himself told me."

"Have you any friends in New York, outside of the trade, who will do you a service?" said Jones.

"Yes; I have a nephew in the dry goods business up town."

"Well," said Mr. Jones, "I'll bet you \$20 against a dinner that your nephew can go to Robinson & Johnson and buy a watch and chain at retail, and they won't even ask him if he is in the trade."

"I'll take that," said Smith, "it's a good bet if I lose it."

Next day, about noon, Smith came into Jones' place and said: "Jones, let's go and get that dinner. My nephew got the watch; they didn't ask if he was a dealer, and, what is worse, they only charged him what they would me."

Mr. Jones continues to sell Mr. Smith, and Robinson & Johnson wonder why he does not buy goods of them. This little incident, related to us by Jones himself, tends to show that the loudest professions are not always accompanied by the strictest integrity. Mr. Jones does not hesitate to say that he will sell goods to his friends, and furthermore, he declares that there is not a manufacturer or jobber in the business but will do the same thing. We are convinced that many wholesalers do sell at retail when opportunity offers, but that the practice is as general as Jones would have us think we do not believe. That is to say, we still believe that there is as much honesty and integrity in the jewelry business as there is any other, and when old and honorable houses declare that they do not retail goods, we believe their word is entitled to the fullest confidence. No one expects that a jobber would refuse to sell to his brother at retail, or to any other near friend, but the construction to put on their assertion is that they do not sell at retail as a rule, and certainly do not seek any retail patronage. That there are many, however, who do

sell at retail to anybody and everybody who wants to buy is unquestioned, and this it is that the retail dealers have a right to complain of, and to combine to prevent. If an agreement among retail dealers to the effect that they will not patronize any wholesale dealer who sells at retail looks like boycotting, the answer is that the boycott is not to injure the business of the person boycotted, but to protect that of the boycotters from the unbusinesslike practices of that individual. Self protection is the first law of nature, and applies to business affairs as well as to individuals.

The Retail Dealers' Protective Association starts off with a membership of over one hundred retail dealers, and this number will, undoubtedly, be largely increased as its purposes are brought to the attention of the trade more generally. It is not expected that it will enter upon an aggressive campaign at once, but will carefully gather its facts and data before resorting to extreme measures. It will also take cognizance of all grievances the retail dealers have to complain of, and apply such remedies as may seem suitable to meet the cases as they come up. We are assured by those who have been active in organizing the association that they propose to accomplish what they have to do in a peaceful manner, but to make their work effective. We certainly wish them success in all legitimate work they may undertake.

The Pendulum and its Laws of Oscillation.

[Read before the Buffalo Society of Natural Sciences, Feb. 12, 1886, by
AUSTIN M. EDWARDS.]

Continued from page 153.

CYCLOIDAL PENDULUM.



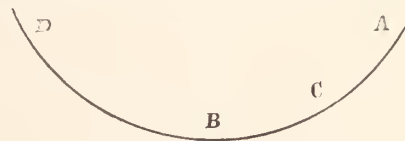
THE ARCS of oscillation of any ordinary simple pendulum are a part of a circle with the point of suspension as a center.

Now, a pendulum producing isochronal oscillations, namely, producing *unequal arcs* in *equal* time is called *cycloidal*, because the center of oscillation must describe a cycloidal path during each excursion on either side of the vertical line.

This curve is one of the most interesting of any known, both in respect to its geometrical properties and connection with falling bodies, and is described in this manner:

If a circle roll along a straight line on its own plane, a point on its circumference will describe a *curve* which is called a cycloid. The peculiar value of this curve in relation to the pendulum will be better shown by inverting a cycloid curve as we have here illustrated.

The time of a body descending from a point of rest *A* to the lowest point of the curve at *B* will be the same from whatever point it starts. In other words, a pendulum will fall from *A* to *B* in precisely the same time it would from *C* to *B*, which is about half the distance.



Following from this, a cycloidal pendulum produces *unequal arcs* in *equal* time or isochronism. The extreme mechanical difficulty of executing a pendulum that will describe a cycloidal path during each excursion has led horologists to originate many ingenious devices to accomplish this end. This pendulum which I show you to-night is constructed so as to cause the center of oscillation to move in a cycloidal path, by coming in contact with cycloid cheeks near its point of suspension, but the effects of moisture, friction, dilatation and adhesion of contact against these cheeks would in time give rise to errors as great as those sought to be overcome. We therefore must make efforts in another direction. The best method of to-day for producing isochronism is to cause the arc of oscillation to be as short as possible, and also have the suspension spring of a given

length and given strength in proportion to the length and weight of the pendulum. Then we will only have to deal with the molecular arrangement of the spring which is constantly changing; but this error is very small and exceedingly regular.

The length of the pendulum rod is just double the diameter of the generating circle. Now, from relations of parts of the cycloid, it is shown that the time of falling down the semi-cycloid is to the time of fall through the diameter of the generating circle as a quadrant is to a radius.

THE BAROMETRICAL ERROR.

A pendulum is affected by the density of the atmosphere, but to a degree that would only be of importance in a precision timepiece, where all the errors are reduced to a minimum. An increase of density of the air is *equivalent* to reducing the action of *gravity*, while the inertia of the moving body remains the same. The rule is, that the velocity of the pendulum varies directly as the force of gravity and inversely as the inertia, and it follows then that an increase of density diminishes the velocity and shortens the time of oscillation, causing the clock to gain time. The barometrical error can be reduced to within three to four-tenths of a second in twenty-four hours for each inch rise or fall of the barometer. Short arcs of oscillation are also essential in reducing the barometrical error. An apparatus is sometimes attached to the pendulum to assist in reducing this error.

THE COMPENSATED PENDULUM.

Bodies increase in volume with an elevation of temperature and diminish when it falls. The pendulum then changes its dimensions with every variation of temperature, and the same is the case with all other parts of the machine.

The elongation of a body in any *one* direction by heat is known as its *linear dilatation*, and its increase in volume, that is, in all three directions, is the cubical dilatation; this depends on its linear dilatation in length, breadth and thickness.

The result to be obtained in a pendulum by compensation is to so construct the same that the center of oscillation will always be in the same point. It is evident that heat lowers this point and cold raises it, and, as we said before, that the time-producing qualities of the pendulum depend on this oscillating point, and only by *compensation* is the desired effect obtained.

I will show you two of the best methods of producing compensation, and begin first by using two metals. The principle underlying this method is the unequal expansion of different metals in the same temperature. This furnishes us with the first step towards compensation.

Let us take a steel rod of the length arrived at by calculation, with a nut and screw on the lower end; resting on this nut is a brass collar with a groove cut in the top. Here is a rolled and drawn zinc tube of a calculated length and thickness in proportion to the main rod. This zinc tube is drawn on over the main rod, and rests on the brass collar at the lower end and at the upper end of the zinc tube, and resting on the same is an iron collar into which is firmly screwed an iron tube which is slipped on over the zinc tube, and at the lower end of this iron tube is attached the weight or bob. It will be seen that this main rod lengthens with heat, and as it lowers, the zinc tube which surrounds it lowers also; but the upper end of the zinc being free, and this metal possessing greater linear dilatation, moves upwards on the main rod, and with it draws up the iron tube that surrounds the zinc and carries with it the weight or bob. The upward dilatation of the zinc tube is just sufficient to overcome the downward dilatation of the main rod, thus keeping the center of oscillation in the same point. In order to construct a compensated pendulum of this kind it is necessary to have the proper proportions of one metal to the other; and besides this, corrections are made from actual tests in different degrees of temperature.

The principal objection to this kind of compensation is that metals expand and contract by infinitesimal waves or jumps, prob-

ably owing to the molecular friction of the metals, and this is most apparent in zinc, owing to its crystalline formation; and this metal is useless unless carefully drawn and prepared before using for the purpose in question.

THE MERCURIAL COMPENSATION.

This pendulum is constructed in the following manner: A steel rod of the calculated length and diameter is selected, and at its lower end is firmly attached a brass stirrup, into which is placed and secured from one to four glass jars containing mercury. If one jar is used, the volume must be sufficient to allow its *cubical dilatation* to raise the center of oscillation just as the *longitudinal dilatation* of the rod has *lowered this point*, and if four jars are used, their diameters shall be reduced to the point that the four will contain the volume of the one jar, and be filled each to the same level as it rose in the single jar. This represents more exposed surface to the changing temperatures and improves the *conductibility* of the *mercury*, causing the compensation to *respond* more *promptly* to *sudden* changes. The four jar compensation is the most difficult to construct, but when well made and carefully adjusted is exceedingly satisfactory, and has the preference in seconds pendulums when greater accuracy is required.

THE SEISMIC ERROR.

This uncontrollable error is caused by earth waves and may occur at any time. One peculiarity is, that many hours elapse before this error shows in the time of the instrument. This error may not be suspected until compared by transit observations.

The time it takes to develop this error is probably due to the molecular disturbances and re-arranging of particles that is taking place in the mercury used for compensation. The most accurately compensated pendulums have been known to vary several seconds in a day. I remember while in Geneva in 1872 that twice in one summer the standard pendulum of the Cantonal Observatory varied once seven and one-half seconds, and at another time five seconds in twenty-four hours; at that time it was not well understood what caused these sudden variations in a pendulum having a known daily equation. But later experiments have shown this error to be caused by seismic waves.

From the simple observation of the lamp swinging from the roof of the Cathedral at Pisa, more than three hundred and forty years ago has grown the thought included in the foregoing laws. The laws of inverse squares and mutual attraction as shown in the simple pendulum, the properties of the cycloid and cycloidal pendulum, the influence of the linear and cubical dilatation, the influence of atmospheric pressure on the pendulum and the centrifugal force from the revolution of the earth on its axis, and by reducing all these errors to a minimum we are furnished with an instrument that performs its work with as much accuracy as any piece of mechanism ever produced by man.

[THE END.]

Repeating Clocks with Quarter and Hour Gongs.

[By HEINRICH FISCHER, in *Oesterr.-Ungarische Uhrmacher Zeitung*.]



FISCHER'S striking work system is shown in fig. 1. As will be seen by the number of the teeth of each wheel, the cut shows a one day spring clock with half seconds pendulum. The striking part lies to the left and consists of the same number of wheels, and is arranged in the same manner as the striking part of any other rake-striking clock. In common with every quarter-clock, this clock also contains the hour star with the hour cam *S*, which, on inspection, will be found to vary slightly from the customary arrangement, to wit, that the cam lies underneath the star, and this latter is actuated by a pin situated upon the side turned toward the dial of the

quarter change. Upon the other side of the quarter change turned toward the watch plate stand the four pins which are to be unlocked at the quarter-hours, and which actuate the spring unlocking *A* in the known manner. More decided deviations from the usual arrangements are shown by the hour change and the quarter cam *s* connected therewith. The hour change is not, as usual, fastened immovably in the plate, but is mounted upon an arbor fastened in the lever *g*¹, revolving around a steady pin. The hour change, together with the quarter cam fastened thereto, consequently can describe two motions: one around its axis and a second around the steady pin of the lever *g*¹; the latter motion, however, is very contracted, and a spring *f* holds the lever against the left side of the place of limit. It will also be seen on the quarter cam, that the step from the highest to the next highest quarter arc is twice as deep as all the other steps—a disposition the purpose of which will be explained further on. At the transit place from the deepest to the highest arc will also be seen the springing beak *o*; it forms a movable prolongation of the highest arc, and has the same purpose as that of the known similar disposition of the quarter cam of a repeating watch.

The lever *g* is of one piece with the lever *g*¹, previously mentioned, and serves for stopping the striking work. At the end of the lever *g*, at *k*, will be found a rectangular, added flirt, upon which butts the warning wheel pin, when the lever is pressed to the right; if, however, the lever is left to the influence of the spring *f*, therefore pressed to the left, then the flirt stands within the motion circle of the warning wheel pin, and the striking work is unlocked. The hole in the plate at *k*, through which the flirt passes, forms the previously mentioned limit of the motion of the two-armed lever *g g*¹. *W* is a surprise piece which maintains the lever *g* in the position of stoppage. *E* is the ordinary rack-hook, *a* the repeating piece. The tumbler differs from those generally found in striking clock by the absence of the flies.

The striking work functions in such a manner that at the full hour only the number of strokes of the proper hour are struck upon the hour gong; at the three-quarters, however, there will, beside the full hour last past, also be struck the number of quarters upon a separate gong.

There is only one hammer, which is, in the passage from the hour to the quarter stroke, displaced in a very ingenious manner. The device to effect this is shown in fig. 1, but separately in fig. 2, which

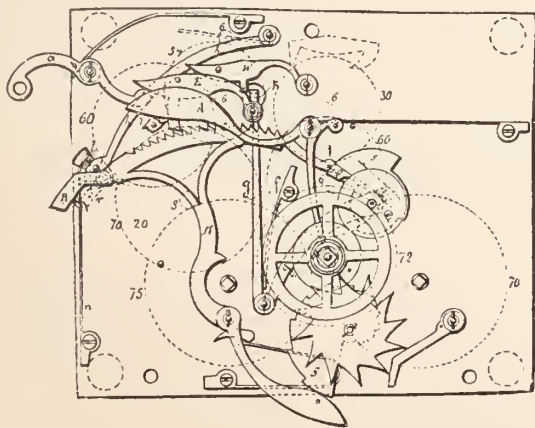


FIG. 2.

is a part of the side view of the clock movement; the single parts are in this cut marked to correspond with fig. 1.

The hammer *H* is with its rod fastened to a canon *r*, which is

mounted upon a pin on the hammer arbor. With this canon is also connected the wire *r a l*, which forms the lever, by means of which the displacement of the hammer is effected by the motion work. The wire lies at *l* upon an arc of the lever *h h* concentric to the hammer arbor, and, consequently, the hammer will alter its plane of motion in accordance with whether the lever *h h* is turned more toward the center or toward the circumference of the plates. Such a turning for the inaudible stroke falling between the two gongs, and which takes place in the pause between the hour and quarter stroke, is effected by the inclined plane between the tooth arc and the raised arc *R* of the rake, by gliding past the erect pin *i*, standing vertically upon lever *h h*, and thereby lifting the lever correspondingly. The raised arc *R*, on the other hand, causes the striking of the hammer upon the quarter gong, because during the quarter strokes it comes to stand invariably before the pin *i*, whereby the hammer receives a uniform displacement, so that the strokes must fall upon the second gong.

As was previously mentioned, the unlocking of the striking work is effected in the known manner by the spring unlocking *A*, as this strikes against the pin of the rack hook *E*, and thereby at first causes the rake to fall on the hour cam. The rack hook, bounding up at this occasion, strikes the pin of the surprise piece *W*, and also this is lifted, which causes the unlocking of the running work, because the double lever *g g*¹ then makes a small motion to the left and remains on the left side of the limit, until it is again pushed back into the position of rest. If in the position of the two cams, as represented in the accompanying cut, the striking works were to be unlocked by means of the repeating piece *a* in place of using the spring unlocking, so as to observe the action of the motion work, it would result in the following observation: The counter arm of *a* raises *E*, and *E* raises *W*, the rake falls with the pin of its arm on the step *I*, and at the same time *g g*¹ makes the small turn to the left, whereupon the wheelwork enters into motion. The tumbler next makes one-half revolution, during which one blow is struck upon the hour gong, and the rake is by one tooth pushed to the interior. At the end of this rake displacement the vertical erect pin *l* encounters the highest quarter arc of the quarter cam, and pushes the double lever, bearing the cam, a little to the right, at which time the surprise piece *W* drops in at once and retains the lever in the position of rest, in which the warning wheel pin must butt upon the closing piece until a new unlocking ensues.

When, now the motion work is set forward one-quarter hour, so that the next lower arc of the quarter cam stands before the pin *l*, then by a renewed unlocking the rake will no longer be pushed back one, but three teeth, until the pin *l* meets the cam, whereby the train is stopped in the described manner. During this rake motion, also three strokes of the hammer are given, the first of which is struck upon the hour gong, the second falls between the two gongs and is inaudible, while the third resounds upon the quarter gong. In the displacement of the second tooth, the inclined plane to the higher situated arc *R* stands already before the pin *i*, and the hammer is displaced one-half; in the displacement by the third tooth, however, the pin *i* lies already upon the higher arc, and, consequently, the displacement of the hammer is such that the stroke falls upon the quarter gong. By placing successively the motion work again upon $\frac{1}{2}$ and then $\frac{3}{4}$, the rake is each time pushed back one more tooth until the stoppage ensues, and therefore each time one more stroke will be given upon the quarter gong, or, in other words, it will strike $\frac{1}{2}$ and $\frac{3}{4}$.

Before the unlocking for the full hour, now, the pin *l* lies in the deepest step of the quarter cam, after effected unlocking, however, this pin, in the return of the rake, must already meet the highest step, because otherwise three quarter strokes would also be struck at the full hour.

[Reprinted from the Mineral Statistics of the United States for 1883-1884. Edited by Mr. Albert Williams, Jr. Published by the Geological Survey.]

Precious Stones.

BY GEORGE F. KUNZ.

Continued from page 144.



SEVERAL MASSES of this material weighing from 4 to 15 pounds each, stalactitic and beautifully botryoidal in form, have been found at the Copper Queen mine, A. T. The finest one of these, weighing 15 pounds, is in the cabinet of the writer.

At the Jones mine, Berks county, Pennsylvania, very dark green and finely mottled malachite was found that would cut into fine gems over 2 inches across. Some very fine specimens from here are in the cabinet of Mr. W. W. Jefferis. The material from this locality equals any from Russia, but the supply is very limited.

Malachite is found in North Carolina in Guilford, Cabarrus, and Mecklenburg counties. At Silver Hill and Conrad Hill, in Davidson county, the fibrous variety has been observed, and at a number of localities in the State, but rarely of any gem value. In the United States sub-treasury, in New York City, are a few fine gem pieces of malachite from the Copper Knob mine in Ashe county, North Carolina.

Chrysocolla.—A beautiful compact chrysocolla, mixed with quartz, is found at the Allouez mine, Houghton, Lake Superior region. Some of the specimens would furnish fine, rich, bluish-green gems one-half inch square.

Beautiful specimens, botryoidal and massive, greenish-blue in color, have been found at the Jones mine, near Morgantown, Berks county, Pennsylvania; and a fine specimen from some Arizona locality, coated with chalcedony, made some beautiful gems when the chalcedony was polished, allowing the botryoidal chrysocolla to show through. In one case these markings resemble a human head.

Anthracite is used to some extent as jewelry, being carved and turned into small trinkets, such as compass cases, boots, hearts, anchors, and other small charms. It could readily be made into beads and round ornaments to be used for scarf pins, lace pins, bracelets, etc., in the same way as jet. It is also turned into cups, saucers, vases, candlesticks, and paper weights, and is carved by hand into a variety of small ornaments. The objects made often have one or more ridges of the rough coal, the other portions being highly polished, thus making a striking contrast. Most of the anthracite is worked at Mountain Top, near Glen Summit, Lucerne county, Pennsylvania. The material used is obtained at the Franklin mine at Ashley, the Spring Tunnel mine at Summit Hill, and at Nanticoke, Pennsylvania. These articles are sold at Scranton, Wilkes Barre, Pittston, Mauch Chunk, and at the Summit Hill station on the Switchback railroad. From \$2,500 to \$3,000 worth of these anthracite objects are sold annually.

Catlinite or pipestone.—Catlinite, which is found in such large quantities in the Upper Missouri region, and especially in Pipestone county, Minnesota, is worked into a large variety of ornamental pipes, that are sold at from 75 cents or \$1 each to as much as \$5 and \$10; and at times as high even as \$20 for very large pieces of carving. They are made in a variety of forms, mainly to sell readily, such as tomahawks with the pipe bowl in the back, and often pipes from 10 to 24 inches long have one or more figures on the stem, which is sometimes made of several pieces, usually, however, of wood. Parts of the pipes are often laid out in designs that are filled in with lead.

This stone is also worked into a variety of ornaments and into small charms of different kinds. These are offered to persons visiting Minnehaha Falls, Lake Minnetonka, various hotels in St. Paul and Minneapolis, and other cities in Minnesota and Dakota as far west as Fort Sully and find a ready sale. The amount sold annually is perhaps \$10,000 to \$15,000 worth. This stone should surely find

more uses from its compactness, easy working, and the fine polish it admits of. One curious spotted variety is very beautiful, and would make a good contrast with the regular red pipestone.

Catlinite is also found at Rice lake, Barron county, Wisconsin.

Amber.—Before the New York Academy of Sciences, February 5, 1883, I exhibited and described an elongated, twisted mass of amber* of a rich yellow color, but opaque, weighing 12 ounces, that had been found on the shore at Nantucket, Massachusetts, evidently from the Tertiary deposits there. This mass more closely resembled the true amber than any other American specimen yet seen.

The Rev. Phœbe Hanaford, at the same meeting, mentioned having found a small piece weighing about 1 ounce at the same locality. Amber has also been found at Martha's Vineyard and at Gay Head.

In a paper read before the New York Academy of Sciences, on the same date, I described a mass of amber 20 inches long, 6 inches wide, and 1 inch thick, and weighing 64 ounces, found at Kirby's marl pit, on Old Man's Creek, near Harrisonville, Gloucester county, New Jersey. A one-fourth inch section showed a light grayish-yellow color. A section one-fourth inch thick showed a light, very transparent yellowish-brown color. The entire mass was filled with botryoidal-shaped cavities filled with glauconite or greensand and a trace of vivianite. The hardness is the same as that of the Baltic amber; it is slightly tougher and cuts more like horn, the cut surface showing a curious pearly luster, differing in this respect from any other amber yet examined by me. This luster is not produced by the impurities, for the clearest parts show it the best. It admitted of a good polish. The specific gravity of a very pure piece of the carefully selected amber is 1.061, which is the lowest density on record, the usual amber range being from 1.065 to 1.081. It ignites in the same way as other ambers. It was found at a depth of 28 feet and under 20 feet of the Cretaceous marl, the amber being found in a 6 foot stratum of fossils.

Dr. N. L. Britton has observed traces of amber near Camden, New Jersey, in the Cretaceous deposits.

Dr. Charles C. Abbott† mentions having several times found small grains or pebbles of amber in the bed of Crosswick's creek. These he gave to Mr. W. S. Vaux, of Philadelphia, and they are now at the Academy of Natural Sciences. He suggests that they are derived from the beds of clay which are exposed in the bluff forming the southern bank of the creek. There are Cretaceous clays nearer Trenton than Crosswick's creek, in which occurs much fossil wood; in and on this grains of amber are not uncommon; they are usually very small and difficult to detect. The wood is soft and very recent in appearance, burning with an uncertain, flickering flame. The amber is evidently derived from the sap of the wood.

The late Professor Kerr‡ mentioned the finding of succinite in lumps of several ounces weight in Pitt county and elsewhere, in the Tertiary marl beds of the eastern counties of North Carolina.

Dr. Troost§ mentions that at Cape Sable, on the northern side of Magothy river and western shore of Maryland, amber of several varieties occurs. One is entirely opaque in concentric zones of every shade of red, yellow and brown, thus displaying the most beautiful colors; another is of a transparent yellow, and another is an earthy porous variety. It is found here in the lignite beds in some quantity. It also occurs on the Chesapeake and Delaware canal in Kent county, Delaware.

Mr. C. G. Yale, of San Francisco, California, says that amber is common in the lignite deposits on the peninsula of Alaska. It is also obtained in the alluvium in the delta of the Yukon river and in the vicinity of most of the Tertiary coal deposits on the Fox islands, being everywhere an article of ornament with the natives who carve it into rude beads.

At no American locality is amber found of commercial value, and

* Now in the Amherst College cabinet.

† *Science*, Vol. I., page 594.

‡ "Minerals and Mineral Localities of North Carolina," page 83.

§ *Silliman's Journal*, page 182, 1832.

although the specimens above referred to are all called amber, they are undoubtedly, with the exception of the Nantasket amber, all from different trees from those producing the Baltic amber, and analyses of them would prove of considerable interest.

Jet.—Jet occurs in the Wet Mountain valley, Trinchera mesa, southeast Colorado, and in the coal seams of most coal-bearing rocks of Colorado. The beautiful specimens of El Paso county, although sold largely for specimens, are very little, if at all, used for ornamental purposes, from the fact mainly that although this perhaps rivals any known jet, black onyx has almost entirely superseded this material in the United States, owing to the greater hardness of the onyx and the cheapness with which it is furnished from Oberstein and Idar.

Meerschaum.—Sepiolite, or meerschaum, has occasionally been met with in compact masses of smooth earthy texture in the magnesia quarries in West Nottingham township, Chester county, Pennsylvania. Only a few small pieces have been found, but they were of good quality. It also occurs in grayish and yellowish-white masses in the serpentine near Stamp's tavern, in Concord township, Delaware county. Masses weighing 1 pound, of a pure white material, have been found on the John Smith farm, Middletown, in the same county.

It has been observed at the Cheever iron mine, Richmond, Massachusetts, of equally good quality, in pieces over 1 inch across.

It has also been found in the serpentine at New Rochelle, Westchester county, New York.

PRODUCTION OF PRECIOUS STONES IN THE UNITED STATES.

While it is impossible to obtain exact returns of the values of the precious stones found in the United States, it is believed that the estimates given in the following table represent, roughly, the total values and the proportionate values of the several mineralogical species. Gold quartz, the value of which would perhaps be more properly included under the head of gold mining, is added at the close of the list.

Estimated production of precious stones in the United States in 1883 and 1884.

| Species. | 1883. | | 1884. | |
|---------------------------|---|---------|---|--------|
| | Value of stones found and sold as specimens and curiosities, occasionally polished to beautify or show structure. | Total. | Value of stones found and sold as specimens and curiosities, occasionally polished to beautify or show structure. | Total. |
| Diamond..... | | | \$800 | \$800 |
| Sapphire gems..... | \$200 | \$2,000 | \$250 | 1,500 |
| Chrysoberyl..... | 100 | 100 | 25 | 25 |
| Topaz..... | 1,000 | 1,000 | 200 | 300 |
| Beryl..... | 200 | 300 | 300 | 400 |
| Emeralds..... | 500 | 500 | 500 | 700 |
| Hiddenite..... | 100 | 500 | 600 | ..... |
| Tourmaline..... | ..... | ..... | 1,500 | 500 |
| Smoky quartz..... | 2,500 | 7,500 | 10,000 | 10,000 |
| Quartz..... | 10,000 | 1,500 | 10,000 | 1,500 |
| Silicified wood..... | 5,000 | 5,000 | 10,000 | 500 |
| Garnets..... | 1,000 | 5,000 | 1,000 | 3,000 |
| Anthracite..... | ..... | 2,500 | 2,500 | 2,500 |
| Pyrite..... | 1,500 | 500 | 2,000 | 1,000 |
| A Amazonstone..... | 3,500 | 250 | 3,750 | 250 |
| Catlinite..... | 10,000 | 10,000 | 10,000 | 10,000 |
| Arrow points..... | 1,000 | 1,000 | 1,000 | 1,000 |
| Tribolites..... | 500 | 500 | 500 | 500 |
| Sagenitic rutile..... | 500 | 1,000 | 500 | 1,000 |
| Hornblende in quartz..... | 500 | 100 | 600 | 100 |
| Peridot..... | 50 | 250 | 300 | 100 |
| Thompsonite..... | 250 | 500 | 250 | 500 |
| Diopside..... | 200 | 100 | 300 | ..... |
| Agate..... | 1,000 | 500 | 1,500 | 4,000 |
| Chlorastrolite..... | 500 | 1,000 | 500 | 1,000 |
| Turquoise..... | 1,500 | 500 | 1,500 | 500 |
| Moss agate..... | 1,000 | 20,000 | 1,000 | 2,000 |
| Amethyst..... | 2,000 | 250 | 2,250 | 250 |
| Jasper..... | 2,000 | 500 | 2,500 | 500 |
| Sunstone..... | 250 | 200 | 450 | 200 |
| Fossil coral..... | 500 | 250 | 750 | 250 |
| Total..... | 47,350 | 44,700 | 92,050 | 54,325 |
| Gold quartz..... | 49,000 | 75,000 | 115,000 | 40,000 |

IMPORTS.

Diamonds and other precious stones imported and entered for consumption in the United States, 1867 to 1884 inclusive.

| Fiscal years ending June 30— | Glazier's. | Dust. | Rough or uncut. | Diamonds and other stones not set. | Set in gold or other metal. | Total. |
|------------------------------|------------|--------|-----------------|------------------------------------|-----------------------------|-------------|
| 1867..... | \$906 | ..... | ..... | \$1,317,420 | \$291 | \$1,318,617 |
| 1868..... | 484 | ..... | ..... | 1,060,544 | 1,405 | 1,062,493 |
| 1869..... | 445 | 140 | ..... | 1,997,282 | 23 | 1,997,890 |
| 1870..... | 9,372 | 71 | ..... | 1,768,324 | 1,504 | 1,779,271 |
| 1871..... | 976 | 17 | ..... | 2,349,482 | 256 | 2,350,731 |
| 1872..... | 2,386 | 89,707 | ..... | 2,939,155 | 2,400 | 3,033,648 |
| 1873..... | ..... | 40,424 | \$176,426 | 2,917,216 | 326 | 3,134,392 |
| 1874..... | ..... | 68,621 | 144,620 | 2,158,172 | 114 | 2,371,536 |
| 1875..... | ..... | 32,513 | 211,920 | 3,234,319 | ..... | 3,478,757 |
| 1876..... | ..... | 20,678 | 186,404 | 2,409,316 | 45 | 2,616,643 |
| 1877..... | ..... | 45,264 | 78,033 | 2,110,215 | 1,734 | 2,235,246 |
| 1878..... | ..... | 36,409 | 63,270 | 2,070,469 | 1,025 | 3,071,173 |
| 1879..... | ..... | 18,889 | 104,158 | 3,841,335 | 538 | 3,964,920 |
| 1880..... | ..... | 49,360 | 129,207 | 6,690,912 | 765 | 6,870,244 |
| 1881..... | ..... | 51,499 | 233,596 | 8,320,313 | 1,307 | 8,606,627 |
| 1882..... | ..... | 92,853 | 449,313 | 8,377,300 | 3,205 | 8,922,711 |
| 1883..... | ..... | 82,628 | 443,996 | 7,598,176 | 2,081 | 8,126,881 |
| 1884..... | 22,208 | 37,121 | 367,816 | 8,712,315 | * | 9,139,460 |

Imports of substances not included in the foregoing table, 1868 to 1884 inclusive.

| Fiscal years ending June 30— | Unmanufactured Agates. | Bookbinders' and other manufactured agates. | Carnelian. | Brazil Pebbles. | Amber. | Amber Beads. | Unmanufactured Coral. | Manufactured Coral. | Unmanufactured meerschaum. | Total. |
|------------------------------|------------------------|---|------------|-----------------|--------|--------------|-----------------------|---------------------|----------------------------|----------|
| 1868..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | \$62,270 | ..... | \$62,270 |
| 1869..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 22,417 | ..... | 22,417 |
| 1870..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 18,975 | ..... | 18,975 |
| 1871..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 37,877 | ..... | 37,877 |
| 1872..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 59,598 | ..... | 59,598 |
| 1873..... | \$151 | 1,310 | ..... | \$1,237 | 1,534 | \$595 | 230 | 63,805 | ..... | 66,407 |
| 1874..... | 177 | 1,524 | ..... | 1,448 | 1,057 | 527 | 28,152 | 270 | ..... | 33,155 |
| 1875..... | 520 | 5,165 | ..... | 57 | 7,169 | 715 | 1,278 | 33,567 | ..... | 40,373 |
| 1876..... | 293 | 1,567 | ..... | 15,502 | 187 | 109 | 33,559 | 21,939 | ..... | 55,860 |
| 1877..... | 579 | 1,904 | 169 | ..... | 17,307 | 329 | 718 | 28,650 | ..... | 30,888 |
| 1878..... | 82 | 494 | ..... | 76 | 13,215 | 1,119 | 1,252 | 12,667 | ..... | 16,308 |
| 1879..... | 138 | 364 | ..... | ..... | 17,821 | 203 | 147 | 11,327 | ..... | 19,088 |
| 1880..... | 57 | 2,346 | ..... | ..... | 36,860 | 2,317 | 62 | 5,492 | ..... | 40,888 |
| 1881..... | 486 | 1,700 | ..... | ..... | 42,400 | 1,102 | 89 | 2,501 | ..... | 47,978 |
| 1882..... | 991 | 5,084 | ..... | 111 | 72,479 | 4,174 | 1,474 | 669 | ..... | 80,885 |
| 1883..... | 14 | 2,895 | ..... | ..... | 49,166 | 3,472 | 681 | 1,303 | ..... | 55,118 |
| 1884..... | 6,100 | ..... | ..... | 3,496 | 56,301 | 4,692 | 158 | ..... | ..... | 65,048 |

[THE END.]

On Eye-Pieces.



WE MAY judge from various scattered particulars, says W. Bradbury, it would seem that more care was exercised in the design of common eye-pieces by the early opticians than what appears to be the case in the present day. It is not, I believe, usual to employ any but plano lenses in common forms; whereas, in old eye-pieces, the lenses had a variety of shapes. Whether any marked advantage attended their use may be doubted; still, it is unquestionable that these early artists must have found some benefit from the use of complex forms, or they would not have gone to the trouble of working such in place of simpler ones. But in those days of feeble competition, time, I presume, was of little value, provided a good result was got in the end. Nowadays "*Tempora mutantur et nos mutamur in illis.*" ("Times change and we change with them.") The trade workman must use that method which, in the least time, will give a result up to the standard required by his customers.

Brewster's "Ferguson," treating of the early forms of eye-pieces, says: "In order to correct the error arising from the unequal refrangibility of light in the eye-pieces of telescopes, we are not under the necessity of using compound lenses of crown and flint glass, as

* Not specified.

† Not separately classified since 1877.

‡ Not Specified.

this species of aberration can be completely removed by a particular arrangement of the eye-glasses which are employed for correcting the object. In small pocket telescopes, such as opera glasses, etc., where it would be very inconvenient to apply a long eye-piece, compound lenses of crown and flint glass should be adopted, and may consist either of two or three glasses with the following curvatures:

DOUBLETS.

- I. Crown lens, equi-convex, radius..... 0.320, focus 0.304
 Flint lens, equi concave, radius..... 0.529, focus 0.438
- II. Crown glass, equi convex, radius..... 0.320, focus 0.304
 Flint lens, double concave..... { 0.320, focus 0.438
 radii..... } 1.517

TRIPLETS.

- I. Crown lens, equi-convex, radius.. 0.640, focus 0.608
 Flint lens, equi-concave, radius... 0.529, focus 0.438
 Crown lens, equi convex, radius..... 0.640, focus 0.608
- II. Crown lens, double convex, radii..... { 0.810, focus 0.608
 0.529
- Flint lens, equi-concave, radius..... 0.529, focus 0.438
 Crown lens, double convex, radii..... { 0.529, focus 0.608
 0.810

If it is required to erect the object as in the Galilean telescope, the middle lens of flint glass must be convex and the other lenses concave, but with the same radii, so that the concavity of the compound lens may predominate.

The following table for arranging a three lens eye-piece is given. Let F=focus of object glass, and *x y z* foci of eye-glasses, reckoning from that which is nearest the object:

| | |
|---|---------------------------|
| 1. Distance between first and second lenses..... | $x +$ |
| 2. Distance between second and third lenses..... | $y + z + \frac{y^2}{x +}$ |
| 3. Distance of first lens from focus of o.g..... | $\frac{xy}{x + y}$ |
| 4. Magnifying power of eye-piece... | $\frac{F y}{x z}$ |
| 5. Focus of a single lens of the same power..... | $\frac{x}{y}$ |
| 6. Distance from the eye to the third lens..... | z |
| 7. Length of the whole eye-piece... | $x + 3y + 2z$ |
| 8. Length of the whole telescope... | $F + x + 3y + 2z$ |
| 9. Aperture of the lenses, <i>a, a', a''</i> ... | $a = \frac{x a'}{y}$ |
| 10. Aperture of diaphragm (<i>m</i>) placed in focus of o.g., should be a little less than..... | a |
| 11. The field of view is nearly..... | $\frac{.3438m}{F}$ |

The apertures of the lenses may be equal to one another, but should never be greater than half the focus of the third lens.

Although the aberration of color will be completely removed by making the lenses of any focal length, and placing them at the distances indicated by the preceding formulæ, yet it is preferable to make the first and second lenses of the same focus, and to give the third a less focus and make its distance from the second equal to its own focus, added to 1½ the focus of one of the other lenses. Beside the simplicity of this combination it has another advantage, for the magnifying power of the eye-piece is always equal to the magnifying power of the third lens. So that in this construction, when we wish to give a certain magnifying power to a telescope, we have only to take such a focus for the third lens as will produce this magnifying power, and make the focus of the other two a little greater than that of the third. By increasing the foci of the two first lenses, the image is not injured by any particle of dust which may be lying on the surface, and the spheric aberration is also diminished. By augment-

ing the curvature of the third lens, however, we contract the field of view which ought, if possible, to be avoided. This may be avoided, indeed, as Boscovich has shown, by making the third lens consist of two convex ones of the same glass, their surfaces being in contact and their foci equal. From long experience he found that eye-pieces of this construction are superior to all others, and that the error arising from the spheric figure of the glass is greatly diminished by making all the lenses plano-convex and turning the plane sides to the eye, except the second lens, whose plane surface should be turned to the object. All the lenses may be made of the same foci, and then the distance between the first and second and second and third will be equal to the sum of their foci. In this case the third and fourth lenses, which are joined together, are considered as a single lens, whose foci is equal to one-half the foci of either of the two.

In all kinds of achromatic eye-pieces composed of single lenses flint glass should be employed, because it has the greatest refraction, and therefore requires a less curvature to give the same foci. The spheric error, consequently, which always increases with the curvature of the lenses, will be less in a flint glass eye-piece. Flint glass, indeed, produces a greater separation of colors, but the error arising from this cause is completely removed by the proper arrangement of the lenses.

A good achromatic eye-piece may be made of four lenses arranged as follows, starting from the lenses next the object: Foci as 14 : 21 : 27 : 32; apertures, 5.6 : 3.4 : 13.5 : 2.6; distances, 23 : 44 : 40. Size of stop in front focus of fourth lens, 7.

Eye-piece of a Ramsden telescope, 8.5 inch; power, 15.4.

Foci, 0.77 : 1.025 : 1.01 : 0.79; distances, 1.18 : 1.83 : 1.10 (inches and decimal parts).

Dollond's four-lens eye-piece in the Duc de Chaulnes' telescope (measured in lines and decimal parts):—

Foci, 14.25 : 19 : 22.75 : 14; distances, 22.48 : 46.17 : 21.45; thicknesses, 2.23 : 1.25 : 1.47.

Fourth lens plano-convex, plane side to the eye; the rest double convex lenses.

Two astro eye-pieces belonging to the same telescope; the first a micrometer eye-piece.

Foci, 12.75 : 5.45; thicknesses, 1.62 : 1.25; distance apart of interior surfaces, 4.2; distance of first lens to focus of object glass, 13.75.

Second eye-piece: Foci, 8.3 and 3.53; thicknesses, 1.6 and 0.97.

Both eye-pieces had plano-convex lenses, plane side towards the eye. Eye-piece of M. Antheaume's telescope on Clairant's formula:

1st lens. Double convex, focus 18 lines; aperture, 9; 1st surface, radius, 11.5 lines; 2d surface, 7 inches, 2 lines.

2d lens. Meniscus, focus 5 lines; aperture, 2. Convex radius, 2.25 lines; concave radius, 8 lines. Distance apart of the lenses, 9 lines.

The Stopwork.

Continued from Page 141.



WE CONTINUE the excellent remarks of Mr. Grossmann, commenced last month under the caption of "The Stopwork."

The drawbacks of the free spring are the following:

1. The absence of distinct perception marking the end of the winding operation. This objection can be removed by cutting three or four vertical grooves into the inner cylindrical surface of the barrel, and by giving the end of the spring a slight bend outward, so that it penetrates a little into one of the grooves. If the maximum of tension of the spring is attained, the end of the spring will no more be arrested by the hold in the groove, and slips into the next one, thereby giving an easily audible click, which is a warning that the winding is completed. This sudden little motion is, at the same time, perceptible to the touch.

2. The great inequality of traction, which must necessarily exist between the two extremities of the development of the spring. This objection seems to be a serious one at first sight, because the watch, if not regularly wound, will continue to go till the tension of the spring is almost exhausted, and it cannot be doubted that in the last hours of expiring march the watch may show some alteration of rate, as compared with the rate it keeps when regularly wound. But every one will admit that no watch can be expected to perform in an irreproachable way if it is subjected to such careless treatment; beside, let me ask, what would be the consequence of a neglect in winding a watch provided with the stopwork? It would lead to a total stopping of the watch, a rather disagreeable occurrence, especially when traveling; and it is precisely under exceptional circumstances that the winding is most likely to be forgotten. In such a case the owner of a watch with the free spring would have to acknowledge it as an advantage that this watch maintains its march, if even with the deviation of some minutes, which, however, would be hardly possible with a good watch, even under such common circumstances.

Thus, the two principal objections against the free spring are fully answered. But there are several practical difficulties which make most watchmakers averse to its employment. This is chiefly the inconvenience of being obliged to keep an assortment of free springs besides the stock of common springs for cases of breakage, and the higher price of free springs adds to the weight of this argument. Springs of the common kind, on the contrary, are cheap and easy to procure.

These circumstances made one reflect whether there was not some means of enjoying the incontestable advantages of the free spring, without resigning the facility of replacing a broken spring of the usual system. I think I have discovered a remedy; at least, one available in a case of need. I take a common spring of suitable breadth and thickness for the barrel, and I break off a piece of the outer end, corresponding in length with the interior of the periphery of the barrel. Out of the end of this piece I form a hook to which the spring is hooked in the common way, so that the detached piece extends backward in the direction of the length of the spring.

This arrangement has the effect that the pressure of this piece against the inside of the barrel increases with the tension of the spring, while with Phillippe's arrangement, traction of the spring diminishes the friction of the outer turn; and this is the reason why this latter contrivance requires the detached pieces stronger than the spring itself. In the modification just mentioned, a piece of the mainspring itself is sufficient, and its resistance may be increased by the grooves in the barrel and by a projection punched at the end of the piece, and lessened by shortening the same. I think a spring arranged in this way would soon make friends, because it offers all the advantages of the free spring without its difficulties for the practical repairer. At any rate it offers the means of providing a watch, in which a free spring is broken, with a new spring in suitable conditions, from the ordinary stock of springs on hand.

THE TRAIN.

The first condition for the construction of the train of a watch is to make it of as large dimensions as the diameter of the movement will admit of. The very limited space allowed by the reigning taste for the movement of a portable timekeeper is already an impediment to the attaining of a high degree of perfection in the gearings; and if it is possible to execute the wheels and pinions of a clock with a satisfactory degree of accuracy, it gets more and more difficult to do so, according to the smaller dimensions in which the work is to be executed. If we had the means of verifying easily the accuracy of the division and rounding of our small pinions, even of the best make, we would soon come to the conclusion that it must necessarily diminish with the dimensions. The inequalities and alterations of shape by the stoning and polishing will be nearly the same with a large pinion as with a small one, only the small one suffers proportionally much more under them. This applies to the manufacturing of the

pinions; but before the pinion runs in the train it has to pass through the finishing process. The finisher first of all will have to verify whether the pinion runs perfectly true, and to set it true in case of need. In all operations of this nature the operator has to rely on his eye for distinguishing whether the state of the piece is satisfactory. But the eye, like all the senses of man, is reliable only within certain limits, and if a good workman pronounces a pinion to be true, this statement must not be taken mathematically; it can only be understood so that an experienced eye can no more detect any deviations from the truth of running. There are, then, in any piece of workmanship, some small defects escaping the most experienced eye, and their absolute quantity is about the same for the large pieces as for the small ones. Let us suppose, for instance, that a careful workman when turning a pinion of 3 millimeters diameter, cannot perceive any defect of truth beyond one hundredth of this size—say 0.03 millimeter. The same defect, indistinguishable to his eye, with a pinion of one millimeter diameter, will be not one but three hundredths of it; consequently it is of threefold more importance with the small pinion taken proportionally.

The same considerations will, to their full extent, apply also to the correctness of the depths or gearings; and it will be clearly seen that it is of the greatest importance to construct the acting parts of the train as large as the diameter of the watch will admit of.

Another matter of great importance is the uniform transmission of motive power from the barrel through the train to the escapement. This uniformity can only be attained by good depthing; and, as it is well known that the depthings are more perfect with the higher numbered pinions, it is advisable never to have the center pinion with less than 12 leaves, the third and fourth wheel pinions with 10, and the escape pinion with 7 at least. The difference resulting therefrom in the cost of manufacturing is so very trifling, that it could not be an obstacle to making even low class watches with these numbers.

The center pinion, it must be admitted, will be more delicate, apparently, and more liable to injury by the sudden jerk resulting from a rupture of the mainspring, or by the pressure occasioned through careless winding. The teeth of the barrel, too, being necessarily thinner, will be more apt to bend from the same causes; but this is partly remedied by the fact that with a pinion of twelve there are in almost every moment two teeth of the barrel acting at the same time on two leaves of the pinion, while in the lowered numbered pinions one tooth alone has to lead through a more or less extended angle. Thus, any sudden shock will be divided between two teeth of the pinion of twelve, and sustained in the same way by two teeth of the barrel belonging to it, whereby the same apparent danger is greatly diminished. Besides, the finer tothing produces a better transmission of power, a weaker mainspring may be used, and, in case of its rupture, the shock will be less violent.

One of the chief conditions for a good and regular transmission of power is a good and suitable shape of the wheel teeth; and it is astonishing to see in what an indifferent way this important matter is treated. It is a well known fact that the wheel teeth, in order to act properly, ought to have an epicycloidal rounding, and no engineer would suffer any form for the teeth of star wheels. Berthoud treated this subject in a most elaborate way about a century ago; Reid and others have also explained the principles of the construction of toothed wheels most explicitly, but in vain. It seems that the greater part of the horological community have resolved to view the shape of their wheel teeth as a matter of taste. All the wheels of English and other makers have, with very few exceptions, their teeth of a shape defying the rules of Berthoud, Reid and other masters—a shape of which nothing can be said, except that they look very nice in the eyes of those who make them, or those who use them, and say, "They look much better, indeed, than those ugly pointed teeth."

There is no possibility of being successful against arguments like these, and I have known many a respectable and good watchmaker

who declared that he could not bear the sight of epicycloidally rounded teeth. This is a subject, however, which can not be more amply entered into in the present essay.

The respective proportions of the wheels of a train ought also to present a certain harmony, attainable by a regular progression in the diameters of the wheels and the fineness of their teeth.

With respect to the escape pinion, at least for the larger watches, I would strongly recommend to have it of eight leaves, with a fourth wheel of 75, and an escape wheel of 16 teeth. The last depthing, the most sensitive of all to any irregularity of transmission, will be found greatly improved by so doing.

The following are the sizes of a train which, according to my opinion, would answer perfectly to the above conditions, for a watch of 43 millimeters=19 lignes Swiss=14 lines English size.

| | |
|-------------------------|--------------------|
| Diameter of barrel..... | 43×0 485=20.85 mm. |
| Center wheel..... | 15.4 mm. |
| Third wheel..... | 13.0 mm. |
| Fourth wheel..... | 11.8 mm. |

The numbers would be:

| | | | |
|-------------------|-----------|-------------|----|
| Barrel..... | 90 teeth. | Pinion..... | 12 |
| Center wheel..... | 80 " | "..... | 10 |
| Third wheel..... | 75 " | "..... | 10 |
| Fourth wheel..... | 75 " | "..... | 8 |
| Escape wheel..... | 16 " | "..... | |

The sizes of teeth are accordingly:

| | |
|-------------------|-----------|
| Barrel..... | 0.345 mm. |
| Center wheel..... | 0.30 mm. |
| Third wheel..... | 0.27 mm. |
| Fourth wheel..... | 0.24 mm. |

It is easy to see that this progression is a very regular one.

The train ought to be arranged in such a way as to have the seconds circle at a suitable place on the dial. This circle, of course, ought to be as large as possible for the sake of distinctness of the divisions, and, on the other hand, it ought not to be so large as to cover entirely the VI. of the hour circle. It may be recommended as a good disposition to have the center of the circle of seconds exactly in the middle of the distance from the center of the dial to its edge. The general observation of this rule would be a decided step toward a greater regularity of construction, and besides it would prove a great boon to all the dealers and manufacturers of dials, and to all the repairers who have to replace broken dials.

A greater circle of seconds might be obtained by approaching its center nearer to the center of the dial, but this subordinate advantage would be too dearly purchased at the expense of the commodious arrangement of the wheel work.

The height of the moving arbors ought to be restricted only by the height of the frame. The longer the distance between the two bearings of an axis can be, the better it will prove for the stability of the moving part as well as its performance. The same amount of side shake required for free action will influence the pitch of a long pinion less than that of a short one.

The diameters of the pivots in the watch work could not be made according to the generally established rules in the construction of machines, for if we should attempt to make the dimensions of our pivots in a theoretical proportion to the strain which they have to resist, we would obtain pivots of such extreme thinness that they would be very difficult to make and handle, and it would be doubtful whether the cross section of such a pivot would not come into an unfavorable proportion with the molecular disposition of the steel. Besides, it ought always to be kept in mind that the pivots of the train must not be calculated to bear with safety the mere pressure of the mainspring, but also the sudden strains resulting from rupture of the spring or from rough winding. Thus, there will be very little to say against the way in which the pivots of watch work are generally made.

(To be Continued.)

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At the regular monthly meeting of the Executive Committee, held on Friday evening, June 4, 1886, there were present President Hayes, Vice-Presidents Johnson and Kimball, and Messrs. Howe, Bowden, Lewis, Greason and Sexton.

Mr. Wm. Bardel, of Messrs. Heller & Bardel, was unanimously chosen a member of the Committee to fill the vacancy caused by the resignation of S. H. Hale.

Seven (7) changes of beneficiaries were granted at the request of members.

A double assessment was ordered on account of the deaths of Samuel H. Upson, of Chicago, and Stephen N. Hyatt, of New York.

One (1) application was referred for investigation, and C. C. Chapin, of Richmond, Va., and W. A. Salmon, of New York City, were accepted as members.

The next meeting of the Committee will be held on Friday afternoon, July 2, at 3 o'clock.

There are no more deaths in the membership of the League of which the Committee has been advised.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of May 11, 1886.

- 341,449—Clock and Clock System, Electric. J. E. Carey, New York, N. Y.
- 10,720—Clock, Electric Pendulum. F. & O. Haenichen, Philadelphia, Pa., Assignors to themselves and O. Seebass, New York, N. Y. Re-issue.
- 341,450—Clocks, Winding and Controlling System for Electric. J. E. Carey, New York, N. Y.
- 341,652—Watchmakers, Bushing Punch for. F. Goeggel, Assignor of one-half to J. T. Sluggett, St. Louis, Mo.
- 341,812—Watchmaker's Screw Driver. C. H. Lucas, Canton, Me.
- 341,647—Watch Protector, Rubber. G. B. Gardner, Lynn, Mass.
- 341,786—Watch, Stem Winding and Setting. C. V. Woerd, Waltham, Mass.

Issue of May 18, 1886.

- 342,205—Clock, Alarm. L. Hubbell, Forestville, Conn.
- 342,086—Clock, Electric Pendulum. F. & O. Haenichen, Phila., Pa., Assignors to themselves and to O. Seebass, New York, N. Y.
- 341,908—Watches to Chains, Fastening Device for Securing. J. T. Healey, Attleboro, Mass.

Issue of May 25, 1886.

- 342,415—Clocks and Regulators, Stem Winding and Setting Mechanism for. J. Zelly, Cincinnati, Ohio.
- 342,745—Mainspring Winder. C. Gullberg, Jersey City, N. J.

Issue of June 1, 1886.

- 342,952—Watch Pouch. M. Dooley, North Adams, Mass.
- 342,864—Watch Regulator. N. J. Eddy, Portland, Mich.
- 342,917—Watch Springs, Machine for Treating Metal Ribbon for. J. Logan, Waltham, Mass.
- 343,149—Watch, Stop. E. J. A. Dupuis, New York, N. Y.

Issue of June 8, 1886.

There were no patents relating to the jewelry interests included in this issue.

The following design patents were issued during the month.

- 16,684—Finger Ring. C. H. Pfeil, Chicago, Ill.
- 16,711—Badge. J. T. Mullen, New Haven, Conn.
- 16,717—Brooch or Scarf Pin. H. L. Logee, Providence, R. I.
- 16,714—Clock Stand. H. J. Muller, New York, N. Y.
- 16,719—Scarf Pin. J. F. Morse, Chicago, Ill.
- 16,722—Setting for Finger Rings. W. Dattlebaum, New York, N. Y.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

THE month of roses, just past, is also the month of marriages the world over. In New York city the bells have rung out one brilliant wedding after another in rapid succession, but all of New York's affairs have paled before the White House wedding, which proved more than a nine day's wonder to society gossips and the grand army of newspaper reporters, who were goaded on to unusual efforts by the mystery that has pervaded every stage of the President's betrothal and marriage.

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REGARDING the wedding presents that have found their way to the White House, much has been published by the daily press, which, sifted down to bald facts, discloses a marvellous amount of ingenious fabrication on the part of the reporters. The truth, briefly put, is this: Comparatively few of the presents were purchased in this city, and in the absence of any exhibition or an official list of the same, but little information that is accurate has been obtained. It is definitely known, however, that the tea set was purchased at Kirk's in Baltimore; that the pieces are lined with gold and elaborately ornamented by the white Baltimore chasing which characterizes much of the fine silver plate of that city.

* *

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THE excuse made for this selection, "That there was nothing in stock in New York suitable," like many other of the stories circulated, was a purely imaginative one. So long as Messrs. Tiffany & Co. possess the famous \$9,000 tea service of the Morgan collection, so long New York contains, to put it mildly, one of the finest specimens of *repousse* work ever executed in this country. At Gorhams is a tea set in *repousse* and fine chasing that challenges competition anywhere, and it goes without the saying that the Whiting Manufac-

turing Company have in stock silverware worthy of any dining room in the land.

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SECRETARY Lamar's present to the bride was purchased in New York city. It consisted of a vinaigrette, the center of which was of fine cut glass with ends of gold studded with diamonds, rubies and sapphires. The Postmaster-General and Mrs. Vilas' gift was a brooch, in form of a bow-knot, of Etruscan gold set with diamonds. The Secretary of the Navy presented a brooch, in shape of a branch with leaves and flowers. This was of antique setting, very curious and beautiful; the leaves and flowers, all diamonds, were set in silver, and the branch, also of diamonds, was set in gold. Mr. Bissel gave a rare diamond pendant. Surveyor Beatty sent a diamond bracelet, on the clasp of which was etched an appropriate scriptural quotation. Governor Hill furnished an elaborate jewel case with a music box attachment. Secretary and Mrs. Endicott, mindful of modern dining room requirements, gave four sterling silver candlesticks in large, massive English pattern. Collector Hedden, with similar intent, contributed a salt dish of platina in unique pattern and resting on gold legs, terminating with pearls for feet. He also sent a companion piece in form of a pepper sifter, bearing an etching of a revenue cutter. E. H. Butler, of Buffalo, contributed an elaborate soup ladie; Mr. Edward Cooper, a silver ale pitcher and mugs; Mr. John R. McLeam, an oxidized gold and silver ice cream dish; and Mrs. M. B. Braden, a beautiful silver epergne. Congressman T. J. Campbell sent the bride a present liable to cause a flood of tears, but still acceptable, in form of a gold horse radish dish, with a love scene from Faust traced out in small diamonds. But space is too valuable to continue the list. Enough has been noted to show the character and style of wedding presents in high life.

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THE President's gift to the bride was a diamond necklace, and this was purchased in this city. The marriage ring was the usual plain gold band, inscribed inside with the names and date. The engagement ring, previously given, was of sapphires and diamonds, a combination for betrothal rings much favored at the present moment in France. The wedding cake boxes, designed by the President and made by Tiffany & Co., have been so often described the past month there is no need for repetition here.

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WHILE the President's bride refrained from wearing any gem ornaments on the occasion of her wedding, the rare toilets worn by the guests were ablaze with jewels of all kinds. Not content with rich silks and rare laces, the extreme height of luxury was reached, in several instances, with embroiderings in gold and the ornamenting of lace with precious stones, after the fashion of court dresses abroad. Mrs. Manning, on this occasion, wore an elegant trained gown of white satin trimmed with seed pearls. These pearls edged the flounces of duchesse lace that covered the dress, while pearl ornaments appeared on the corsage and in the coiffure. A triple row of fine pearls encircled her neck. Mrs. Whitney, whose dresses as well as dinners have been pronounced the most perfect seen in Washington for many years, wore a gown of violet tulle over violet velvet; gem-woven lace was about the low cut bodice, and pearls and diamonds were on her neck and in her hair. The fan carried on this occasion was of point lace, mounted on enameled sticks, incrustated

cases of a leading New York house. These new goods add another to the long list of successes in enamel work done in this country.

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A NOVELTY just out and likely to take with everybody who affects English fashions is the primrose pin, which comes as a neck pin for ladies' wear and a *buttonaire* for gentlemen. This is of silver enameled to copy exactly the flower from which it takes its name. Its origin is, as has been intimated, English, and of political significance. The primrose, being the late Disraeli's favorite flower, was adopted by his admirers and followers, who first wore the natural bloom and this was accepted as the badge of the Primrose League Club. Naturally this flower, later on, was copied in jewelry, and Englishmen and women took it up. When Miss Frank Folsom returned from abroad it was whispered that she had brought back a primrose pin. One enterprising reporter claimed even to have seen it on the neck of that gray traveling dress so often described. One cannot always depend on what newspaper reporters say, but this much is known, the ladies and dudes in New York, for some reason, want the primrose pin, and one manufacturer has been sufficiently enterprising to meet the demand with the exceedingly attractive little flower ornaments described.

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A NEW feature in silver jewelry consists of lace pins, sleeve buttons and studs set with moonstones. In some cases the moonstones are of natural color, in others they are tinted a delicate pink or blue. An attractive lace pin in silver represents an old inn sign, from one end of which swings a lamp of moonstones set in silver.

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BAR pins and bracelets, made of a combination of metals, including gold, silver and copper, furnish attractive ornaments in rococo style.

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BOUQUET pins, in gold and in silver, always find some demand in cities, but in this country are as yet confined to the use of the ladies. In Paris gentlemen, however, are wearing gold and silver safety pins for fastening a flower in the button hole. Our jewelers think that when any jewelry is worn at the button hole it will be the primrose pin.

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A PRETTY conceit in silver neck pins are those that take on the form of a single flower, in the heart of which appears double fancy stones. These stones are so set that by touching the stem of the flower the center is reversed; this arrangement furnishes virtually two pins, as with each change of the center the stone changes.

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A FAVORITE bangle consists of numerous slender gold or silver wire circlets, no two of which is decorated alike. As many as eighteen to twenty-four of these are worn on one arm, each one independent of the other, not being connected in any way, but hanging loose around the arm.

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SILVER belts, also leather belts with silver trimmings, are in demand

for summer wear. An English style is represented by a plain broad silver band in satin finish. The newest thing seen in this line is a belt consisting of sections of fine leather joined with silver links and having on either side a number of silver chains. Attached to these chains are divers articles, useful and otherwise, of silver and decorative in effect. One seen had a silver purse, a card case, tablets, a whistle, a pin cushion and a smelling bottle.

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AMONG other enamels now fashionable are translucent enamels showing wonderfully clear and perfect greens, reds, blues and other hues. This style of enamel is especially effective when a powder of rose diamonds is added to it.

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IN THESE days an important feature of the house beautiful is the dining room and its furnishings. In many modern dwellings the room devoted to the enjoyment of the "creature comforts" is simply palatial in its decorations and belongings. Naturally this tendency to luxurious comforts results in collection of choice and oftentimes rare china and glass, with silver objects of great value. In these latter THE CIRCULAR'S readers are most interested, and a brief description of some of the silver seen in the mansions of people of wealth may not come amiss, for while comparatively few may indulge in table luxuries *ad libitum*, everybody is more or less interested in knowing the fashions and thereby gaining many useful hints for their own selections, even though these are to be made in silver plate and at a relatively small cost.

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CONSPICUOUS on the modern dining table are the candelabra just now in high favor and often representing old English designs. Mr. George W. Childs, of Philadelphia, who has some \$50,000 invested in silver, china and glass, has upon his dinner table, when set for a formal dinner, a center piece in richly chased silver of vase form and finished at the top with eight burners. At either end of the board are exquisitely designed candelabra in gilt and silver, which stand two feet high and hold a number of wax candles. Standing by the candelabra at one end of the table is a silver wine cooler, with four raised panels representing cupids and graces in its *repoussé* work. The corresponding article at the other end of the table is a crystal bowl fifteen inches in diameter and nearly as high, in a silver standard, that is used for flowers. The silver objects on this far-famed table are too numerous to mention in detail, but this much may be said, and that is, they represent not only every style of finish known in the silversmiths' craft, but the work of all nations. This renders the collection of especial value and interest, and while everybody may not have original examples, many may, with a little care and taste in selection, soon become possessors of a unique and choice assortment. An object of special interest in Mr. Childs' service is the coronet of the English peer, Lord Broughton, which does duty as the base of a crystal fruit dish. Another unique piece is a silver bottle simulating an owl, copied from one in the British Museum.

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BEFORE dismissing the subject of Mr. Childs' dinner service, it must be told that the crystal flower bowl described is reputed to be one of the finest, if not the finest, specimen of American glass ever manufactured. The work was done by none other than Thomas Hawkes, a descendant of the Mr. Hawkes who first introduced cut-

glass into England. Not only does Mr. Childs' table represent in its glassware the best of American manufacture, but choice and characteristic examples of Bohemia, Carlsbad and other famous localities.

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THE elaborate and beautiful ornamentation bestowed now-a-days on such practical objects as spoons and forks, is very noticeable. Hand engraving on spoons and forks has met with decided approbation and called out new patterns. Numbered with recent engraved patterns that come within the average buyer's reach and commendable for attractiveness is the Jac Rose pattern, which, as the name suggests, is a design of the favorite jacqueminot rose.

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TO READERS of these fashion notes outside the trade, who depend on THE CIRCULAR for keeping them posted in all matters pertaining to jewelry and silverware, it is explained that an article need not of necessity be absolutely new to be in fashion. In a word, the extreme novelties often fail to become popular, but are described along with standard goods because it is THE CIRCULAR'S business to keep its readers informed in all directions. When it describes a newcomer, therefore, it ought to be understood that time alone will prove whether it is to be a favorite. When it states that a thing is fashionable or popular, or likely to have a long run, readers may then buy without hesitation, for that thing *is fashionable*.

ELSIE BEE.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number One.

WHILE THE history of the horological industry has had due attention paid to it in Great Britain and the Continent, until now no complete history of the achievements of the fathers of American horology has been undertaken. Many of the old pioneers in this industry are passing away, and it seems fitting that a record should be made of their struggles and triumphs.

Very few watchmakers of the present day have an idea of what a bold and daring conception those early watch and clock manufacturers had, and what great opposition they met with even among those from whom they expected support. And yet in those struggles which, in many instances, ended in disappointment, those men were shaping and molding the future destinies of this industry, not alone in America, but laying a foundation so broad that their productions should subsequently drive out foreign competition to a great extent, and in their export trade compete with foreign manufacturers on their own soil. These articles are not intended to be a literary production, but as an original record of verified facts from an unbiased standpoint, and it is hoped by the writer that they may be of some practical service, especially to the younger members of the craft, and if this end is subserved he will be fully satisfied that his labor has not been in vain. A number of amusing incidents will be related by way of variety, which will serve to illustrate some of the primitive methods which were employed in doing work not many decades ago as compared with the present methods.

When we use the term "American watch," we are apt to think of its being produced in a factory, such as we see to-day, filled with the finest machinery known to human skill, and much of it so nearly

automatic that it seems like a sentient thing of life. Such, however, has not always been the case. The present perfection has only been obtained by long years of arduous work and study by many of the best mechanics which our country has produced.

The first real stride in making watches by machinery was by Messrs. Dennison, Howard & Davis as the Boston Watch Co., at Roxbury, Mass. (now a part of Boston), and subsequently at the old factory in Waltham. Some other efforts at watch manufacturing had been made previous to this, and we will glance briefly at them before going into the history of the company just mentioned.

The first attempt in America was by Luther Goddard in Shrewsbury, Worcester Co., Mass., where he commenced in 1809, a short time after the embargo had been laid by Congress in that year, which seriously affected, if not entirely prevented, commercial intercourse with other nations. Mr. Goddard was a native of the town, his family being among the oldest in the country, having settled there in 1667. He was born Feb. 28, 1762, and went to Grafton where he served an apprenticeship at clock making with his uncle, Lemuel Williard. He returned to Shrewsbury in 1785 and bought a small farm, got married and divided his attention between clock making after the old style and farming. This he did until the time he commenced to make watches, when he gave up the farming to one of his sons and gave his entire attention to horological pursuits.

The building was one story high with a hip roof, about 18 feet square, with a lean-to at the back for a casting shop. It was situated on the declivity of Shrewsbury hill, and was, of course, built for his clock shop, but earned distinction of being the first watch factory in America. Every trace of it has been obliterated, and the exact date of its erection cannot be ascertained, but it was probably about 1790. As to the watches which he made, they were, of course, quite similar to the English verge watches of that day, and, in fact, could not be otherwise, as so great a portion of the parts were obtained from England. The movements were of medium size, and

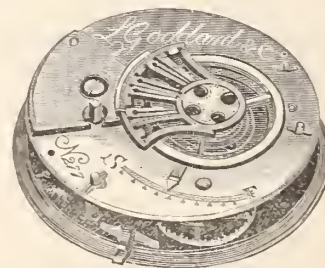


FIG. 1.—THE GODDARD WATCH.

We are indebted to Mr. A. WEBSTER of the American Watch Tool Company for the watch from which this cut was made.

were engraved and fire gilded by a man in the adjoining town of Marlborough. Mr. W. H. Keith, one of the former Presidents of the Waltham Watch Company, who was one of his earliest apprentices, is the authority for stating that the hands, dials, round and dovetail brass and steel wire, main and hair springs, balance verges, chains and pinions were all imported, and were bought from material dealers in Boston at war prices. But when it came to the matter of plates, wheels and other brass parts, it cannot be charged that he did any forging, for he cast them all himself, and his workmen filed and turned them into shape, and, considering all things, the watches are certainly most creditable in their workmanship. He had, however, one advantage in having with him several watchmakers who had come to America years before as British soldiers in the Revolution, but who had afterwards decided that America was not such a bad place to live in, and had made it their home. The cases for these movements were, of course, made there also, and were of the usual style of open face double case, and somewhat in advance of the prevalent style of thick bull's-eye watches of the day.

The first watch which he made was sold to the father of ex-Gov. Lincoln, of Worcester. Mr. Goddard took his eldest son, Parley, into partnership with him, and the business was going along nicely until the death knell of American watch making, for a time, at least,

was sounded in the treaty of peace signed at Ghent, Dec. 24, 1814. Before the fall of 1815 the country was flooded with cheap and worthless watches, and although the watches made by the Messrs. Goddard commanded a high price, they soon found their business badly crippled. In 1817 Mr. Goddard removed with his younger son, Daniel, to Worcester, where they carried on a repair business. Up to the time of the removal about 530 watches had been made, but Mr. Parley Goddard, who remained at the old stand in Shrewsbury, subsequently increased the number to about 600. He afterwards turned his attention to farming. Mr. Goddard not only enjoyed the distinction of being the first man in America to make watches, but he came to have quite a reputation as a local Baptist preacher and evangelist. He was familiarly known all over Worcester County as "Elder Goddard," and "had a profession," as he properly esteemed it, "high above his secular vocation." With these few words of reminiscences we leave him. He remained in active business until the time of his death, which occurred in 1842, at the age of 80 years.

The reader's attention is next directed to the Pitkin watch, which was the result of the first attempt to manufacture watches by machinery in America, and was designed and manufactured by Mr. Henry Pitkin and his brother, James F., of Hartford, Conn. Previous to engaging in the manufacture of watches, the Pitkin brothers had carried on a manufacturing jewelry business in East Hartford near where the railroad now passes. Here they had built a shop and employed from twenty to twenty-five workmen. They were quite successful, financially, up to 1837 when the panic occurred, and was the cause of closing up their affairs. Having previously been engaged to some extent in watch repairing, Mr. Henry Pitkin now conceived the idea of manufacturing an American watch. He interested his brother in the scheme, and at once went to work to invent the necessary machinery for manufacturing watches. He worked early and late, and soon had his plans sufficiently advanced so that he could set their four former apprentices, who were then all young boys, to work making the tools and machinery to make watches with. Their names were Amariah Hills, N. P. Stratton, who subsequently occupied a prominent position with the American Watch Company, Samuel Alexander, and a boy by the name of Nelson, who remained but a short time. The machinery, which was all original with Mr. Pitkin, was certainly rather crude for watch manufacturing, but nevertheless displayed great inventive genius on his part.

The first watches were turned out in the fall of 1838 with no help but the four apprentices, who worked for thirty dollars per year and their board, as the Pitkins' had very little capital at that time. The movements were about 16 size and $\frac{3}{4}$ plate. The plates were punched out with dies from rolled brass, in a very similar manner to that employed by other factories at a much later day. They used lantern pinions with tight leaves. The trains were the slow or English 14,400 train. Several experiments were tried in order, if possible, to



FIG. 2.—THE PITKIN LANTERN PINION.

improve on the old method in which the pivots run in the plates or jewels set in the plates. The plan first was to make the ends of the pinion conical, and have them run in the ends of hardened steel screws with countersinks, quite similar to the plan now used in marine clock balances. Then a new idea was tried which may be described as follows: A large brass setting was put in the plate, extending above the surface. Through this and parallel to the plate 3 screws with small jewels in their ends were inserted until they closed about the pivot with the proper side shake. The idea of this being to arrange the depths of the wheels and pinions very easily. This was soon found impracticable. It was likewise expensive and was put into only a few movements. The next plan was to make regular pivots, letting them extend partly through the plate, and then controlling the end shake by means of screws in the plate which run down onto the ends of the pivots, thus reducing friction and making it practically a

"cap jewel" train. This plan was used until they commenced jewelers in the regular way. The cut which we give has this arrangement. Just here it may be said that Mr. Henry Pitkin's idea in using some, if not all, of the foregoing devices, was to use only that which they could make themselves, and to use as little imported material as possible. At that time, however, they were unable to make jewels of the regular kind, even if they had desired to use them. The escapement was made with the star or English style of escape wheel tooth. They made gold and steel balances which were also patterned after the English balances. The movements were not interchangeable. They were all fire-gilt, as electro-gilding was not yet known. The dials, hands, main and hair springs and balance jewels were, of course, imported, but before the regular style of balance jewels were used, they used a device of which a cut is given, much enlarged.

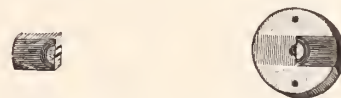


FIG. 3.—THE PITKIN STYLE OF BALANCE JEWELING.

The slides having jewels in them similar to a balance jewel cut in half that would slide up to the pivots, barring the side shake necessary for freedom, of course, and then they were set fast by the screw at the bottom. The movement, of which a cut is given, has



FIG. 4.—THE PITKIN WATCH.

this arrangement in it also. Just when it was dropped for the regular style of balance jewelers the writer is unable to ascertain. The pallets were made and jeweled in the factory. A description of the peculiar manner in which they made them is worth noticing. First, a brass disc, two and one-half inches in diameter, was turned true, then a strip of soft steel, wide and thick enough to make a pallet from, was bent around the disc and cut off at the proper length to form a band or circle around it, as is shown by the dotted lines in cut; this was soft soldered to the periphery of the disc; then the center of the steel band was turned out to approximate to the inside of the pallets; it was then put into a Swiss cutting engine, and slots sawed in each edge or part for the pallet stones, the cuts being made at equal distances by means of the index; the jewels were of garnet, nicely fitted and cemented in, after which the protruding parts of the jewels were trimmed off with a diamond cutter down to the steel; the metal and jewels were then ground to a gauge and polished both inside and out, the proper impulse angle given and corners taken off. It will be readily seen that the rounding of the impulse face of the pallet from top to bottom was in proportion to the size of the disc used, as it would be rounded much more in a small than in a large one. The



FIG. 5.—METHOD OF MAKING PALLET.

pallets were then cut apart in the cutting engine, and, as they had only soft solder to hold them to the edge of the disc, they could be easily taken off without heating. The upper and lower sides and backs were then finished and holes drilled for the arbors.

Although many of the methods employed by the Pitkins' may seem very primitive to us of the present day, they certainly reflect great credit upon those who used them, when the imperfect state of mechanical and horological knowledge of that day is taken into con-

sideration. The watches had going barrels, as with Mr. Pitkin's progressive American ideas it would never do to use an English fuz e and chain. By reference to the cut of the movement it will be seen that the American flag was engraved on the plate as a reminder that it was indeed an American watch.

Just in this connection the writer cannot do less than pay a tribute to Mr. Henry Pitkin, and to his brother, James F., as well, for their skill, perseverance and loyalty to their convictions that an American watch "should be made in America," and not made abroad with an American name on it. It goes to show how thoroughly Mr. Henry Pitkin, who started the enterprise and was at the head and front of it, was imbued with the true spirit of American independence, and is certainly a good example for the manufacturer of a later day to follow.

The first fifty movements were stamped with the name of Henry Pitkin, but afterwards the firm name of H. & J. F. Pitkin was used. The former represented the mechanical and the latter more especially the business part of the enterprise. They made their own cases, which were of gold and silver, and of the English style. This branch of the manufacture was under the superintendence of Mr. John R. Proud, who had served his apprenticeship with the old firm of Messrs. H. & D. Tarbox, at the corner of Maiden Lane and Nassau street, New York City. He was afterwards at Waltham for many years. He went to East Hartford in 1839, making the tools that were necessary for case making there.

In October, 1841, the Pitkins' moved to New York City, and located on the west side of Nassau street, two doors above Maiden Lane. They were accompanied by Amariah Hills and John R. Proud, who continued to work at their respective branches, and subsequently to have an interest in the business. The Pitkin watch number 378 is marked "Pitkin & Co., New York," and is undoubtedly one of the first produced after their removal. They continued to make both movements and cases for a time, but afterwards dropped the former as they found they could not make a good watch as cheaply as the Swiss and English, and therefore could not compete. They subsequently removed to 116 Fulton street, and continued to manufacture cases there until 1845.

Business had become dull with them, and it so preyed upon Mr. Henry Pitkin's mind that he became insane. While being conveyed to the Bloomingdale Insane Asylum in April, 1845, he jumped from a culvert to the bottom of the croton aqueduct, which was then being put through, and was killed. Mr. James F. Pitkin died a few years afterward, and Mr. Hills took the business after his death, removing soon afterward to 23 Maiden Lane, where he carried on the business until 1852, when he retired and took up his residence in Connecticut where he now resides. It is estimated that from eight to nine hundred complete watches all told were made by the Pitkin brothers. They were sold by the jewelers of Hartford and New York. Although the Pitkins' failed to make a financial success of their American watch enterprise, they nevertheless deserve great credit for their bold conception, when such a thing as making watches by machinery in America was among the impossibilities to most men.

Reminiscences of Chaux-de-Fonds.



AN INTERESTING continued article entitled, "Reminiscences of Chaux-de-Fonds, its growth and importance as a center of the Swiss watch industry," giving short biographies of the old watchmakers and engravers of that flourishing city, is at present being published in the *Deutsche Uhrmacher Zeitung*. As it speaks of men famous on both sides of the ocean, for instance, Ducommun, Henri-François Brandt, the several Drozes, Maillardet, etc., we translate the following:

Pierre Jaquet Droz was born at Chaux-de-Fonds in the year 1721. While still a boy he showed a decided taste for study, his parents therefore sent him to the University at Basle, where he graduated in theology. After having passed examination he returned to Chaux-de-Fonds, where he found his sister engaged in watchmaking. In order to pass his time, he commenced to assist her in her work, for which he showed so great an aptitude that he soon became passionately fond of the pursuit, and finally decided to relinquish theology and devote himself entirely to horology.

His extraordinary talent for contriving automatic mechanisms had until then laid dormant in him, but this being once awakened, it developed with incredible speed, and the young pastor became in a short time the best watchmaker in the neighborhood, excelling all his colleagues. This made him bold; he soon dispensed with the handed-down, antiquated methods, and tried his own ideas, which were so practical that even his first attempts were considered to be decided improvements. He next commenced to add bell chimes and flute notes to the simple clocks, or an artificial canary bird which issued from a handsome cage, and sang his song so naturally, accompanying it with the appropriate motions, that it was frequently mistaken for a natural bird.

Once arrived at this point, Jaquet Droz ardently pursued the construction of new artistic clock movements and marvelous mechanisms or automata, for which he soon acquired so great a celebrity that his name and fame rapidly spread all over Europe.

The ingenuity evinced by him in the execution of his art works is astonishing, and the precise, yet perfectly natural, motions of the latter sometimes border on the supernatural. He made automata, the construction of which cannot yet be explained intelligently with all our advanced state of science; among other objects, it is said that he manufactured a pendulum clock which struck the correct hour and minute when simply asked: "Quelle heure est il?" ("What time is it?") without touching it. It is thought that the artist made use of the breath of the questioner (the question was to be asked in close proximity to the clock), whereby it acted upon the clockwork and caused the unlocking of the striking train. The artist constructed a number of clocks which, beside the hour, minute and second, showed the course of the sun through the zodiac, the four seasons and the changing phases of the moon; while they struck and repeated at the same time the hour, quarter and half-quarter. After the striking of the hour, a chime or a play of flute in the most varying melodies resounded, to which responded an echo; many of these clocks were, beside these additions, provided with movable figures or automatic singing canaries, etc.

None of these art works can at present be found at Chaux-de-Fonds, however; all were sent to foreign countries where they brought better prices than at home. One is at Madrid, whither Jaquet Droz went about the middle of last century. His visit there is connected with a characteristic anecdote. The artist showed a pendulum clock, which was a veritable masterpiece of composition, to the King of Spain, Ferdinand the VII., with which the latter was so charmed that he paid 500 Louis d'ors for it, beside the traveling expenses of the artist.

A few days afterward the king invited a few courtiers to show them his new purchase. At the striking of the hour a shepherd made his appearance upon the clock and played six pieces, after which his dog approached him. "This dog," said Jaquet Droz, "is as watchful as he is kind. Will your majesty, in order to try his temper, please to take an apple from the basket standing near him?" The king attempted to take an apple, but at the motion the dog turned on him and barked so naturally, that a dog which was in the room also commenced to bark. The courtiers thought that this was a well defined case of sorcery and ran away devoutly crossing themselves, only the king and the minister of the marine remaining. The latter next asked the shepherd upon the clock in Spanish what time it was, but received no answer, whereupon Jaquet Droz said that the shepherd had not yet mastered the Spanish language, and requested the

minister to ask in French, to which the shepherd responded. This was more than even the minister could stand, and he also ran away. The artist suddenly perceived the danger of his situation, viz., that he stood in eminent peril of being brought before the Grand Inquisitor, put in prison and even of being burned at the stake as a sorcerer; he therefore solicited the king to send for the inquisitor. Jaquet Droz then took the movement down, showed the mechanism and explained its several functions and the performance of the whole. It may well be assumed that the Grand Inquisitor did not understand one iota of the entire explanations, still, it appears that the artist by flattering his vanity, convinced him so fully of the harmlessness of the automaton that this functionary made known publicly that the clock contained no sorcery whatever, but was actuated simply by a mechanism and natural means, and that he, the Grand Inquisitor, had leisurely inspected the work and was ready to vouch for its harmlessness. This stroke of policy saved the artist from the clutches of the rigorous inquisition, and protected him from the violence of the fanatics who began to regard him with suspicion.

Another anecdote is told of him which, at the same time, shows that he was far from being puffed up by self-conceit. He exhibited publicly his several automata in Chaux-de-Fonds, and explained their functions and performances. After having finished, a plain looking man stepped forward and said: "Sir, all these things are very nice, but a grain of barley is, after all, more useful; can you make such a one?" The artist responded quietly: "My works are human works, but a grain of barley is God's work."

(To be Continued.)

Syphilitic Diseases of the Eye.

[BY DR. C. A. BUCKLIN, NEW YORK.]



IN ATTEMPTING to give a few practical suggestions regarding this important class of cases, I admit my inability to cover the ground. Every author I ever read has most completely failed to do the subject justice. During the past ten years the greater part of the surprises I have met with have been practical demonstrations of what syphilis can do, and what a hidden, obscure course the disease may run.

I am thoroughly convinced that syphilis does much that our best specialists will not admit of its doing, and that it can do much that I have not as yet seen it do. Let us consider the following case as illustrative of what it may do:

Master J., aged twelve years, has taken a slight cold in the head, which his mother says has settled in his eyes. The eye is slightly red but does not itch or burn, nor do the lids stick together. Doctor Smart is consulted; he assures the mother that he has had a very large experience in the treatment of diseases of the eye, and that he is disgusted with specialists because he has made so many cures where they have failed, simply because he understands the general system so much better. He also claimed that from his long contact with the various members of this particular family that he had made a great many valuable observations regarding the peculiarities of the systems of the family.

Doctor Smart commenced the treatment of Master J. with rose water and sulphate of zinc, which would have done well had the trouble been in the eyelids, but the eyes increased in redness. Soon the cornea began to have a white, steamy look, which rapidly reduced the boy's vision so that he could no longer count fingers. The mother's fears were quieted by Dr. Smart's positive assurances that the eyes were doing nicely. The father, however, when he discovered that his boy could not count fingers became unruly, and greatly offended the doctor by insisting upon having some acknowledged specialist examine the boy's eyes. Even the terrors of having an operation performed upon the eye, which would certainly put the

eyes out, did not deter the father from trying to do something for the child.

I was accidentally visiting the town, and was called in to examine the boy.

He appeared to be a weak, sickly boy; upon opening his mouth the three upper front teeth were notched, showing slight imperfection of development during foetal life.

The cornea appeared the color of escaping steam; the eye all around the cornea was injected.

The notched teeth with a *large circular notch* indicate hereditary syphilis each and every time. They appear different from the imperfectly developed teeth of consumptive persons.

After ten years of most careful observation, I have no patience with the growlers who dispute the fact that these peculiar teeth mean inherited syphilis.

You may frequently have inherited syphilis without the teeth, but never the teeth without the syphilis.

I immediately commenced to urge upon the child large quantities of milk. Gave iodide of potassium and small doses of mercury, and also stimulated the cornea (perhaps uselessly) by dusting calomel in the eyes daily. In ten days the boy could count fingers; in ten weeks his vision was perfectly restored. This case was one of simple interstitial inflammation of the cornea, which I believe is always due to syphilis, and most frequently due to inherited syphilis.

It occasionally happens that the obscured vision can not be cleared up. The earlier the treatment is commenced the better the chance is of perfecting the vision.

Case II.—Mr. B. contracted the disease and was treated for it for several weeks, when all manifestations disappeared. The physician pronounced him cured and discharged him. Five months later, while at work in his store, he observed a slight obscuration of vision which gradually increased; at the end of four days he could only count fingers at a few feet. Upon looking into the eye with the ophthalmoscope, the optic nerve was seen to be in a state of acute inflammation. The patient is placed in bed and treated with iodide of potassium and mercury, the latter being the most important at this stage of the disease.* The cure in this class of cases is usually complete providing the treatment is energetic, and the patient be confined to bed during the first week of the attack at least. I am a firm believer in the beneficial results which confinement to bed brings about, in all acute inflammatory diseases involving the deeper structures of the eye. In this class of cases, where the optic nerve is early attacked in the course of a syphilitic disease, the prospects are better than in that class of cases where the optic nerve becomes involved later.

In the first class of cases the vision is so seriously disturbed that the person is led to consult a specialist early, while in the second class of cases the failure of vision is so very gradual that the optic nerve is seriously atrophied before the person becomes seriously alarmed about his eyes.

In most all cases of optic nerve atrophy, the failure to recognize all shades of *red* or *green* color is a prominent symptom. I never could understand why railroads should choose as signals the two colors *red* and *green*; if a man fail on colors, these two colors are the ones which he will certainly fail to recognize first. It is very rare to meet a person who is color blind who will not promptly pick out yellow or blue. Consequently I think these two colors should be used in railroad signals instead of red and green.

Case III.—Miss B., a most charming young lady of twenty, highly cultivated. Her family, including herself, are most energetic members of church societies. She complained of seeing a few fiery sparkles; in a week the eye in which she saw these sparkles became so blind that she could not see the flame of a lamp at four feet unless the lamp was carried to the extreme right, left, above or below. There were no evidences in any member of the family of any specific taint.

* This case recovered normal vision in fourteen days.

Every one who saw the case decided against the possibility of any syphilitic cause.

Upon examining the eye carefully I found a white patch of exudation in the position of the visual spot of each eye. The spot in the blind eye appeared the same as the spot in the eye which still had good vision. It has frequently been observed that these lesions frequently exist for some time before the functional activity of the eye is in any way compromised.

The disease looked to me to be syphilitic, and I pronounced it to be of this nature. I reported the case to several friends, who were specialists, and they all gave a very unfavorable prognosis.

One eye was blind, and the other eye was in the same diseased condition as the blind eye; the prospect was certainly sad. I ordered her to go to bed in a darkened room, and commenced immediately with thirty grain doses of iodide of potassium three times daily, also mercurial inunctions; in ten days the obscured vision commenced to clear; in four weeks she had normal vision in both eyes.

What would have been the fate of the young woman if I had, owing to the evident purity of parents and daughter, decided that syphilis was an impossibility, and refused to treat her for syphilis simply because I did not believe she had it? She would have certainly become hopelessly blind. I have a most profound respect for the man who knows syphilis when he sees it, and is not misguided by the surroundings of his patient. A specialist of reputation who is weak on this one point is responsible for much unnecessary blindness.

Subsequent investigation brought to light the fact that the young lady's grandmother had suffered for years from recurrent iritis. Her oldest daughter recollects distinctly these attacks her mother had, and described them so minutely that I could recognize them at once as attacks of syphilitic iritis.

The condition which usually follows during the first few years of syphilis is of an acute inflammatory nature, and causes the eye to be very painful and intensely injected. Acute inflammation of the optic nerve. Choroiditis and retinitis are not attended with pain, neither is there anything about the eye to attract the attention of the observer; the patient, however, complains of obscure or misty vision.

The commonest disease of late syphilis is atrophy of both optic nerves, from connective tissue hyperplasia within the brain; the results of treatment in these cases, while it is the only chance, is not very flattering. The earlier you get at them the better is the chance of success.

If the few scattered hints about the part syphilis plays in diseases of the eye will in any way impress my readers with the old motto, "A stitch in time saves nine," I shall have been amply repaid for trying to say so much in so limited a space.

Letters regarding persons who are blind will be answered through THE CIRCULAR for the benefit and instructions of our readers.

The Society of Arts.

The Mechanical Art of Watchmaking in America.

[Read before the Society May 19, 1886, by Professor LEONARD WALDO.]



THE meeting of the Society of Arts, held in London May 19, Professor J. Norman Lockwood, F.R.S., F.R.A.S., presiding, Professor Waldo, by special invitation, read the following paper:

The study of the evolution of a mechanical art in any country is a study in social and political, as well as in mechanical science. It often depends for its rapid and progressive growth on the characteristics of the people among whom it is planted. Of no art is this principle more true than of the art of machine watch and clock making in the United States. Born among a people who, from the beginning of their history, had to construct their own devices

and machines of all kinds, it has had the same growth and individuality which characterizes the manufacture of locomotives, agricultural implements, or house fittings and decorations. Unlike these classes of manufacture, however, and more analogous to the production of firearms, the clock and watch products are suited to other people and other countries. It is the economic question growing out of these facts which has led to my appearance before you this evening, in the somewhat unique position of a visitor from the United States, explaining to an English audience the conditions of growth in a great industry, in the early development of which England for many years maintained the leading position.

One of the sayings which we hear more frequently in England than in the United States, is that the preliminary training for a great President is to be found in rail-splitting or on the towpath of a canal. The truth underlying this homely remark is, that in the United States the freedom from supervision, the assumption of tasks, the absence of help, the necessity for doing things as quickly as possible, the great variety of work which comes to the American boy early, gives him practice in solving new problems without considering precedents. He is obliged to face new difficulties constantly, and he has no one to appeal to for help.

Throughout the country I think you will often be struck with the general mechanical intelligence of artisans. The plumber is pretty apt to know something of carpentry and metal work; the metal worker can paint or turn from iron to brass. The lines of caste in the mechanical arts are so loosely drawn, that the artisan of one trade is often found, in dull time, at a "job" in quite another department of labor. This versatility is a characteristic of the native American; it is less true of the Irish or the German emigrant who settles amongst us. The presence of this pure American type, the abundant use of water power, the impossibility of competition in agriculture with the other sections of the United States, early led to the seclusion of New England as the manufacturing district. The phrase "as inventive as a Connecticut Yankee" came from the fact that in Connecticut and the rest of New England the artisan class grew rapidly in numbers, and protected by wise legislation in regard to the patenting of inventions, every artisan feels there is a possible road to wealth in perfecting the tools he is working with, or the method of production of the thing he is working at. At any rate, patents are cheap and quickly obtained; he will take the risk, he thinks, and work in his own line to better his condition. He constantly sees his fellows transferred from the ranks of workmen to that of employer and manufacturer, and the result is that he cares little for trade practices, for custom, for what is old; he is only anxious to improve the present modes to attain his own success.

It was a mind of this type which showed itself in the son of a shoemaker (who was also colonel in the State militia) in the little town of Brunswick, Maine. Born in 1812, Mr. Aaron L. Dennison had the training which might be characterized as presidential, for he carried a mason's hod at the age of ten, and changed his occupation to that of caring for a herd of cows at eleven. At thirteen he found himself sawing wood and strengthening his constitution for the cares of later life, and a year or so later he was promoted to that position from which so many bright ideas in life has come, the shoemaker's bench. At eighteen his dissatisfaction with this bench led him to take to another, and we find him apprenticed to a clock and watch making firm in his native town, where he stayed till he was of age. He left the town of his birth in 1833 to perfect himself as a journeyman watch and clockmaker, going to Boston, where were then good facilities for learning the higher branches of the horological art. His thoughts soon turned upon the organism of labor in the production of watches looked at as machines for time keeping, and independent of a value as articles of jewelry or art. It is to be borne in mind that from the beginning of the horological art it had been associated with the workers in the precious metals. The promptness of the driving business life throughout the civilized world was but beginning to be felt in its modern force. Few people cared for the

minutes of time in domestic timepieces, still fewer for the seconds. The modern ideas were undeveloped, of synchronized clocks, of observatory time signals, of swift trains, of banking hours and stock exchanges in which seconds were of high financial value, of thousands of miles of telegraph wire in the same clock electric circuits once or twice every day, so that Greenwich or Washington time might be furnished with unerring exactitude to railroad superintendent or guard alike. The great public yet were unfamiliar with modern business competition and consequent necessity for extreme uniformity of time in engagements, which is an unconscious accompaniment of the life of to-day. But it was all dawning, and to the mind of Dennison it seemed that timepieces should be made simple in pattern, alike in parts, so that pocket watches could be made in enormous numbers, on principles analogous to those in the manufacture of firearms. The idea haunted him. He writes:—

"The principal thinking up of the matter was done when I was in business at the corner of Bromfield and Washington streets, Boston; and many a night, after I had done a good day's work at the store and a good evening's work at home in repairing watches for personal friends, I used to stroll out upon the common and give my mind full play upon this project. And now, as far as I can recollect what my plans then were as to system and methods to be employed, they were identical with those in existence at the principal watch factories at the present time."

In 1840 Mr. Dennison predicted "that within twenty years the manufacture of watches would be reduced to a system as perfect and expeditious as the manufacture of firearms at the Springfield armory." Capital was not forthcoming, however, to what seemed a visionary scheme. It was not until 1849, when a friend, Mr. Edward Howard, approached him for his advice as to the expediency of setting up works for the manufacture of American locomotives, that he had the opportunity of suggesting the probable paying qualities of an establishment for making watches as other machinery was made with interchangeable parts, in large quantities, and with the principles of shop management of mechanics rather than of the watchmakers. This proposal impressed Mr. Howard more favorably than his own plan for building locomotives. Together they found a capitalist willing to share with them the risks of the adventure. I shall use Mr. Dennison's own words as to what followed the meeting of the three projectors:—

"I suggested that the first money spent in the undertaking should be for a tour of observation in the watchmaking districts in England, with the view of ascertaining whether the trade of watch making was carried on there on the system represented to me by English workmen I had employed from time to time in repairing. Another object I had in view was to find out the source of supply for the necessary materials, such as enamel for dials, jewels, etc."

Then he goes to England on the proposed mission, and writes, in regard to it:—

"I found that the matter had been correctly represented, but in carrying out their system one-half the truth had not been told. How that the party setting up as a manufacturer of watches bought his Lancashire movements—a conglomeration of rough materials—and gave them out to A, B, C and D to have them finished; and how A, B, C and D gave out the different jobs of pivoting certain wheels of the train to E, certain other parts to F, and the fusee cutting to G. Dial making, jewelery, gilding, motioning, etc., to others, down almost the entire length of the alphabet; and how that taking these various pieces of work to outside work people—who, if sober enough to be at their places, were likely to be engaged on someone's work who had been ahead of them, and how, under such circumstances, he would take the occasion to drop into a 'pub' to drink and gossip, and, perhaps, unfit himself for work the remainder of the day.

"Finding things in this condition, as a matter of course, my theory of Americans not finding any difficulty in competing with the English, especially if the interchangeable system and manufacturing in large quantities was adopted, may be accepted as reasonable."

I cannot omit, in this connection, a reference to the contemporary art of the application of machinery to watch making in France as well as to England. By reference to documents, now in the Guildhall Library, of the Clockmakers' Company in London, I find that the Clockmakers' Company opposed the erection of works and the granting of a charter to a company known as the "British Watch and Clockmaking Company. (By Royal Letters Patent.) Capital, £250,000, in 10,000 shares. Deposit, £2 10s. per share." In a report of a committee of the guild, they review the attempts of Mr. Ingold to establish companies for systematizing the production of watches and clocks in Paris in 1835, concerning which the committee says:—

"The committee is enabled to state that it failed entirely, without realizing anything to the parties who embarked their money on the speculation. It was scarcely two years in existence, for early in 1838 Mr. Ingold was in London, endeavoring to open a door to transfer his unsuccessful project to the shoulders of the British public, but the bait at that time was not alluring and the project for a season abandoned.

"The Parisian Watch Making Company having expired, a similar company, with similar pretensions, without the name of Mr. Ingold attached to it, made its appearance at Versailles in the year 1838. By some it is denied that Mr. Ingold belonged to this establishment, but it will require more than simple assertion to make such statement credible. The prospectus of this company, issued in 1838, contains the following: Manufacture of French watches, established at Versailles under the special protection of the king. The manufactory which, from its commencement, has obtained the powerful patronage of the king, has been in full operation since 21st February, 1838. It already employs more than 200 workmen, attracted from the best workshops of France and foreign countries. It is not a matter of speculation—it is a thing accomplished. A board of manufacturers, including the principal watchmakers of Paris, MM. Lepante, Lessine, Charles Leroy, Robin Mathieu, constantly overlooks the perfection of the works.

"The object of the company is to liberate France from the tribute she pays to a foreign country, and to restore to our commerce a part of the thirty millions at least which are drained yearly to buy more than 120,000 watches from Geneva. The company is already in a position to satisfy all orders for watches from 200 to 600 francs; it can multiply the number of its productions by means of the perfect machines which it possesses. By the aid of those machines the principal parts of a watch are made of uniform size and great quickness; the precise exactness is an invaluable advantage, which alone renders the establishment without a rival of its kind.

"A watchmaker who visited this vaunted establishment in 1839, has given the committee the following particulars:—I was introduced into spacious premises; two or three directors received me with much courtesy. I was shown a large room containing machinery for escapement making, etc., but of the two hundred men said to be employed, the number I saw did not exceed six or eight, these were occupied in making watches without the aid of machinery, employing only the tools generally in use. I did not see a single complete watch. The person who introduced me to this establishment called at my house in London in 1840, and told me that it was defunct. It is remarkable that coincident with the period at which the formidable machinery of these companies ceased to move, Mr. Ingold came to reside in London and renewed his canvass for support to a 'British Watch and Clock Making Company,' which, increasing its pretensions, has put forth its title to the trade of the whole world.

"The committee has in vain attempted to discover the names of those 'most experienced makers of watches in London, those men prominent in science, not one of whom has expressed a doubt of the efficacy of the machinery to facilitate the manufacture of watches, or of the fact that work so produced will be incomparably superior to that done in the usual way.' On the contrary, some of our manufacturers and several of our practical and scientific workmen who

have seen the machinery, have not only directly denied the possibility of its success, but have rejected advantageous overtures to identify themselves with the company.

"In reference to the objects of the company and the powers it assumes to possess, the committee, as practical men, nurtured in the watch making business, explicitly states its conviction and belief that they are absurdly and fallaciously stated. It has given the company an opportunity to prove before it the powers and applicability of its machines to effect the miracles that have been ascribed to them. At an interview, 22d March, 1843, on its premises at 75 Dean street, Soho, they were then requested, urged and challenged to exhibit proof of the working of their machinery before your committee. The favor was claimed on behalf of the trade at large. This request was refused upon the most frivolous and contradictory pretexts. The committee advisedly declares its firm persuasion that the company is not in a capacity to make good its assertion upon the subject of letters patent which have been taken out to secure these newly invented machines to the company, the committee would remark that the specifications have not yet been enrolled. It considers the features of the case to present the strongest ground for a petition to Parliament, praying it to refuse its sanction to the doubly concentrated monopoly. The rise and progress of this adventure has been thus far traced, together with the career of its founder; he has failed in carrying out a similar object in Switzerland, in Paris and in Versailles, and he is now re-asserting the same pretensions, the stale romance of twenty years, upon the credulity of the British public.

"It may be asked, if this undertaking be founded on such a visionary basis, why not leave it unnoticed to fall piecemeal into ruin?

"The reply is evident and conclusive. At the same time that its failure is most confidently predicted, the consequences involved in its destruction are not to be lightly regarded. At a time when the watch trade is languishing in sympathy with every branch of our national industry, the uncontradicted assertions of the company's prospectus have aggravated the depression; and although manufacturers of watches are fearless of competition, and regard as impracticable the success of the company, yet they cannot conceal from themselves the fact that a large capital worked against them, under the protection of monopoly legalized by Act of Parliament, though for a limited period, may severely prejudice their interests and involve a large body of industrious workmen in privation and distress."

The bill for the formation of the English company was thrown out by the House of Commons on the 31st of March, 1843.

It has been stated in English horological circles that Mr. Dennison had the benefit of Mr. Ingold's ideas and inventions in the formation of his own company in the United States. I cannot find any evidence that this is a fact; and in this connection, as a contribution to the history of the early American horology, I will give Mr. Dennison's own statement of his knowledge of Mr. Ingold and his schemes.

"I have to say I never heard of Mr. Ingold or his operations until after our factory was built at Roxbury, and were hiring our work people. An applicant for a situation, a Frenchman by the name of Boudet, I hired to do the facing of pinions, as that work required some hand manipulation such as no machine which had been thought of at that time could do it so well—so far as I know, the thing has not yet been accomplished. This man Boudet told me that he was a son-in-law of Mr. Ingold, and, I think it fair to conclude, had worked for him in London; but I have no recollection whether he told me so, or whether he informed me of the connection between himself and Mr. Ingold at the time, or after he had been at work some time. I never saw Mr. Ingold, but I knew of his being about in Switzerland during our residence there. I never knew of his being in America until a long time after we came here (Roxbury) to live. I always had the impression that the British Watch Company obtained an Act, as I was told by Boudet, or some one I thought

knew, that it cost, to obtain the Act, £30,000; and that the machine which he got up for making the plates alone cost £6,000."

The first company formed in the United States was not, financially speaking, a success, neither was the second. There had not then been found the financial ability for the head of such a company, and it was not found until May of 1867, when Mr. Royal E. Robbins bought the factory for \$56,000—on which Mr. Dennison, his friends and successors, had expended some \$250,000—at an auction sale.

It was one of those happy assumptions by a man who had great capacity and a recognized financial ability, of a great manufacturing interest, to which he proposed to bring the new and needed element of business sagacity. It became the precedent for the formation of other companies, and now, instead of the single company at Waltham, there are in the United States its great and well-managed rival company at Elgin, Illinois, and the smaller companies at Rockford, Aurora, Springfield, Ill., and Springfield, Mass., Nashua, N.Y., Columbus, O., Fredonia, N. Y., and Thomaston, Conn., and I am told there are nine others at the present writing in process of organization. The combined output of these factories, which produce watches of durability and a certain excellence of manufacture, is not far from 4,000 per day, of which the parent company produces about 1,100, with a machine capacity for 500 more per day.

The total population interested in the manufacture and selling of watches and clocks, directly and indirectly, in the United States, is not far from 100,000 people, and the sales of the leading company during the year 1884, amounted to \$3,900,000 of products.

To give some idea of the extent of the entire industry in 1880, I quote the following table made up from the returns of the United States census for that year, remarking that the industry has very much increased since that date:—

Table showing the statistics of clock and watch making in the United States in 1880.

| Subjects. | No. of establishments. | Capital. | Average No. of hands employed. | | | Total paid in wages per year. | Value of materials. | Value of Products. |
|---------------------------------|------------------------|-------------|--------------------------------|------------------------|---------------------|-------------------------------|---------------------|--------------------|
| | | | Males over 16 years. | Females over 16 years. | Children or youths. | | | |
| Clocks | 22 | \$2,474,800 | 2,807 | 630 | 503 | \$1,622,693 | \$1,908,411 | \$4,110,267 |
| Watches | 11 | 4,144,327 | 2,127 | 1,219 | — | 1,712,276 | 982,224 | 3,271,244 |
| Watch Cases | 27 | 1,584,740 | 1,418 | 139 | 201 | 976,041 | 2,812,922 | 4,589,314 |
| Watch and Clock Materials | 20 | 117,550 | 184 | 45 | 40 | 86,050 | 130,315 | 300,195 |
| Totals | 80 | 8,321,517 | 6,536 | 2,033 | 753 | 4,397,060 | 5,833,872 | 12,271,020 |

It is not to my purpose to follow out the actual making of individual watches by machinery; that is quite impossible in an hour's paper. The study of a machine for the automatic manufacture of screws alone could occupy the time. The object is rather to analyze the broad difference in the requirements of the industry when it is transferred from the journeyman's bench to the well appointed machine shop. I shall draw my illustrations from the great company to which I have already referred, having its location at Waltham, a little town some twenty miles from Boston, in Massachusetts. I do this because this company exhibited a very fine array of its machines at the Inventions Exhibition, and my effort now will be to add to your knowledge there gained, the ideas of policy and management regulating such a great establishment.

A new people is not an art people. It takes age, leisure and accumulated wealth to give masses of the people artistic ideas. The first test they apply to any new machine is that of utility. In the United States this is a fundamental element of the early success of the watch companies. Automatic machines are very costly. No one can afford to make automatic machines for a thousand watches, or for a hundred thousand. It is only when a simple type can be made and have an enormous sale that machinery can be extensively applied. In the United States the company of which I speak barely lived until the Civil War broke out. Immediately there was a great

demand for watches, strong, serviceable, uniform in quality; there was an opportunity to make a simple type. The buyers were not critical as to finish if only the watches would run. They did not require art in the case so long as it was strong. A minute a day was accurate enough for their use, and the art could easily produce such timepieces. There was the opportunity. The factory which paid no dividend at the beginning of the war paid 4 per cent. the first year, 11 per cent. the second, 22 per cent. the third, and two dividends of 60 and 150 per cent. the last year of the war. It would have been impossible to pay any such dividends except that the watches were of simple types—interchangeable parts—screws, plates, hands, wheels and dials, all manufactured by machinists, running well made machines, under the supervision of machinist foremen.

The machinery was built and paid for. The great questions of getting homogeneous raw material, of learning the capacity of machines, of determining what kind of labor—whether of boys or girls, or men or women—was most efficient in any given department had been settled. Through the simple, cheap but efficient work of the years from 1857 to 1865, the whole art of machinery, as applied to making watches, was being studied by men of the highest mechanical and business ability, and without the slightest regard to any preconceived trade notions or customs or traditions. The great idea was that millions of now civilized people wanted watches, with China and Japan, and India and Africa yet to be heard from.

To create and to supply any such possible demand would require the same business organization as the supply of cottons or metal ware. There must be an organization reaching from the selection of the raw material to the selling of the product in distant markets. To secure homogeneity of material, *i. e.*, uniform texture of the metals employed, without which machine-made watches would be of temporary value, the most recent advances in physics and chemistry must be made use of. To time the watches properly, not only are the observatory time signals from Harvard University used, but a separate observatory, fitted up with a recording chronograph and transit instrument of a refined construction, has been erected. A dark room, with all the apparatus for experimenting in photographic processes of reproducing dials, etc., is in full operation. Systematic experimenting in tempering steel, in testing metals for their physical properties, is carried on, and some of the most exquisite physical apparatus I have ever seen, I have seen in these measuring rooms. Those of you who are microscopists, and who know of the extreme accuracy of the small standards of length made by Professor W. A. Rogers, of Harvard University, need only be told that the most beautiful of his smaller machines was built and used at the Waltham watch factory, under the combined direction of himself and the mechanical superintendent.

Given a scientific knowledge of the raw materials, a certainty in their selection, and it becomes possible to reproduce the hand processes of manufacturing the small parts of watches by automatic machines. This requires the fundamental department of the company—a well appointed machine shop, in which their machinery can be constructed and repaired. This machine shop occupies the three stories of a wing 150 feet long. The operatives from this department have the constant supervision of the machines, which are systematically arranged along the three and a half miles of work benches which extend over the nearly five acres of floor space covered by the main buildings. For driving the machinery throughout the factory, a Corliss engine of 125 horse-power works through 39,000 feet of belting, 10,600 feet of main shafting, 8,000 feet of wall rods and 4,700 pulleys. The number of operations, most of them accomplished by automatic machinery, which is "tended" by a young woman or man having no special knowledge of horology as a whole, in the manufacture of, say, the common "18 size full plate, keyless, four-pair jewels" watch movement is, by count of the twenty-five foremen of the different departments in which it is made up, about 3,746.

The American system of manufacturing by interchangeable parts

means much more than making a part under the roof of a factory, buying other parts in the market and obtaining other parts by the piece from work people who live in their own cottages, for which they are paid at piece work rates. It means the establishment of working facilities for the entire manufacture. That everything is made on the premises, not according to the plans or ideas or methods of work of individual workmen, but under the direct supervision of a company's foreman, according to gauges the company furnish, under conditions of time, cleanliness and care which the company prescribe. The operative himself is a machine. There is as little as possible variation in the drill of a great factory.

The results of this are shown in a promptness of delivery, in a uniformity of products, utterly unattainable under the prevalent methods of what is called the factory system outside of the United States, where the work of operatives is collected from their local habitations to be made up into timepieces at a central putting together establishment.

A little later in the evening we shall see, from the photographs, the various departments of a great watch factory, and I pass now to other considerations of interest to you. It is already apparent to you that the master-mind of such a company is to be chosen for his general executive qualities and his ability to conduct a manufacturing business, rather than his technical knowledge of watches. In 1884 there were 2,500 operatives in the factory we have quoted. Only a few, and those in the designing and putting together departments, were professional horologists. There are machinists, and draughtsmen, and die sinkers, and steel workers and gilders, and enamellers and photographers, and men of many trades, each working in their own departments. Their tools are found by the company, they work on the company's premises, they report at a given hour, have certain intervals for rest and go home at another hour. They are exposed to the strictest supervision during the progress of their work, and they have every attention given to their personal comfort. Plenty of light, plenty of fresh air, and a comfortable warmth pervades every part of the enormous buildings, to which the 2,500 (in 1884) operatives repair every morning for their duties. Taken all in all, I believe it is the most intelligent body of operatives in any industry known to me. Making up, as they do, the community in a very cultivated part of New England, they have every opportunity in the way of libraries, literary clubs, church life and social advantages. One is very much impressed with the intelligence, taste and general attractiveness of the operatives generally, and the women in particular, as they sit at their benches and machines. The delicacy of their work and the *esprit de corps* of the entire body are the two conducting factors to this result. In giving employment, a good character is insisted on. It is rather a remarkable fact that almost the entire number are native born American, with very few, almost none, of the Irish, who are most numerous in other systems of manufacturing. The morality of the young women is on a par with their general intelligence. It is very rarely indeed that one is found against whom the breath of scandal is heard. Marriage amongst the operators is frequent, and the romance of life is not ignored. Homes are made as well as watches. There has grown up in the factory the spirit of interest in its social associations, in its products, and an interest in its reputation which can only come of a large, industrious, intelligent, well-fed and well-paid community. The company finds it to their interest to maintain these feelings among the operatives. Parks are laid out; cottages, which are both tasteful and healthful, are built; good drainage and ventilation are secured; trees, flowers, lawns, are used to beautify the homes, streets and grounds about the factory buildings. A large hotel has been built for the exclusive use of the young women who are not married and who wish to live in it. I had the pleasure of dining at this hotel, in the dining room at the tables of which about 120 young women were seated. The meal was nicely served, and consisted of roast beef, roast mutton, potatoes, corn (maize), turnips, with apple pie and coffee and cheese for dessert. The charge which the company

makes for board alone is \$2.25. per week, or for board and lodging, \$3 per week. Breakfast is served at half-past six in the morning. Now, when we consider the average daily pay of the women on the rolls is \$7.98. per week, it can be understood that they have a margin for dress and other things which makes their life quite attractive to them. With their general intelligence there is born the natural desire to become skillful and expeditious in their work. They become specialists with the new machines put into their hands. They know machinery to be their friend, for anything which will make two watches where one was made before will halve the cost of the watch, but will not halve their wages, and will make their services still more valuable to the company. They are not afflicted with trade notions or customs; they are thoroughly malleable in their methods of work, and quick to do any new thing required of them. They are inventive and suggestive.

Under the administration of such great establishments there have grown up completely new methods of work. The claim that the machinery, processes, methods of organization of a great American watch or clock company are not original, is as ridiculous as to say that the Falls of Niagara are not original. The one is as much a product of the inventive genius, the disregard of trade laws and customs, the intelligence and necessity of production of an Anglo-Saxon country separated by 3,000 miles of water from any other Anglo-Saxon country, as the Falls of Niagara are the product of the waters of the lake basin and the topography of its outlet. The machines of these places are unique. They must be so. They are made on the premises to suit the individual needs of the establishment. For some of the important processes there are as many kinds of machines as there are distinct factories in the United States.

So far we have been referring to the middle class of watches, made in lots of many thousand at a time and designed for general use. But it is evident that it needs only the addition of the adjuster's skill to produce on the same system, timepieces of a very high precision of running. So the leading American watch companies have put forward the claim that it is only necessary for them to add an adjusting department to their factory organization, and they will produce timepieces which will be much less in price, and equal in performance to the timepieces made by the very best foreign producers on the old systems. So such adjusting departments have been added to several of the leading factories. In these departments a watch is rated and adjusted to position and temperature for periods ranging from a week to six months, depending on the price at which the movement is to be sold. The watches which are meant for the very finest time keeping are adjusted at two extreme temperatures, and in the five positions of dial up, dial down, pendant up, pendant right and pendant left. The adjustment of a watch is somewhat analogous to the adjustment of sights on a rifle. All the parts of an admirable weapon may be there, and the sights may be approximately right; but it takes actual trial, and the slight adjustment of the sights, to make any given rifle do its most accurate work.

As far as the success attained by the American method in watches of the very highest class is concerned, I can do no better than to quote the results of the trials of timepieces at the Observatory in Yale College, made under the direction of the Corporation of the College for the years 1881 and 1884 inclusive. Their trials are conducted at the Observatory of Yale College, and involve the daily comparison of watches in the following positions and temperatures for a total period varying from six weeks for watches of the highest class, down to twelve days for watches of simpler adjustment, according to the following schedule:—

| Test No. | Position. | Approximate Temperature. | Number of days trial for Class Certificates. | | | |
|----------------------------|-----------------------------------|--------------------------|--|-----|------|-------|
| | | | I. | II. | III. | IV. |
| 1 | Dial vertical, Pendant up..... | 60° to 70° F. | 7 | 8 | 8 | 12 |
| 2 | Dial vertical, Pendant right..... | 60° to 70° F. | 2 | 2 | — | — |
| 3 | Dial vertical, Pendant left..... | 60° to 70° F. | 2 | 2 | — | — |
| 4 | Dial horizontal, Dial down..... | 60° to 70° F. | 2 | — | — | — |
| 5 | Dial horizontal, Dial up..... | 60° to 70° F. | 10 | 8 | 8 | OR 12 |
| 6 | Dial horizontal, Dial up..... | 34° to 38° | 1 | 1 | 1 | — |
| 7 | Dial horizontal, Dial up..... | 95° to 100° | 1 | 1 | 1 | — |
| 8 | Dial horizontal, Dial up..... | 60° to 70° | 10 | — | — | — |
| 9 | Dial vertical, Pendant up..... | 60° to 70° | 7 | — | — | — |
| Total number of days | | | 42 | 22 | 18 | 12 |

The conditions excluding watches from receiving certificates of any class were as follows:—

1. When the variation of rate with the dial vertical and pendant up in classes I., II., III., and in the positions indicated in Class IV., exceeds 2^s.0 from one day to the following day.
2. When the variation of rate between the positions of "dial up" and "dial vertical" exceeds 10^s.0.
3. When the variation for 1° F. exceeds 0^s.3 between the ordinary temperature and the oven.
4. When the rate is greater than 10^s.0 per day in any position.

The number of watches entered for the period under consideration was as follows:—

| | |
|--------------|-----|
| 1880-81..... | 219 |
| 1881-82..... | 53 |
| 1882-83..... | 41 |
| 1883-84..... | 87 |

And the analysis of the results of watches of the highest class for the four years is as follows:—

| | 1880-81. | 1881-82. | 1882-83. | 1883-84. |
|---|-------------------------------|----------------------------|----------------------------------|--------------------------------|
| Percentage of watch movements receiving certificates of any kind, excluding watches entered for rate records..... | 45 | 38 | 28 | 77 |
| Number receiving Class I. certificates..... | 22 | 12 | 8 | 42 |
| Average mark of Class I. certificates..... | 68.8 | 68.6 | 76.4 | 74.4 |
| Average mark of the first five watches receiving Class I. certificates..... | 79.4 | 77.0 | 80.4 | 85.8 |
| Highest mark received during the year..... | 83 | 82 | 85 | 90.4 |
| Makers' name of watches receiving the highest mark during the year..... | { American Watch Co. Waltham. | { Barraud & Lunds, London. | { Vacheron & Constantin, Geneva. | { American Watch Co., Waltham. |

In reference to these "marks" I would like to explain that they are affixed to certificates on a scale of 100, of which 40 are awarded for a perfect position adjustment, 40 for the capacity of a watch to run at a uniform rate from day to day in any given position, and 20 for a capacity to run without a change owing to ordinary changes of temperature. The table shows, therefore, that in two of the four years' trials, one of the American companies entered watches which were the very best in performance of all the watches entered, and that the watch showing the highest record of any entered was one of American manufacture. I quote these results as conclusive evidence that by the American system of machine watch making watches may be, and are, produced, having all the fine running qualities of the best watches made under the ordinary system at a much greater cost.

[At the end of the paper a series of views of the buildings at Waltham, illustrating the various processes of manufacture and the social life among the operatives, were shown on the screen by means of the electric light. A watch movement, made at the factory, was also shown in motion on the screen, to illustrate the detailed parts of a movement as made by machinery.]

The lecture was discussed at length by Messrs. Whipple, Ganney, Bedford, Bragge, Frodsham and Glasgow, each of whom expressed his delight at the clear and forcible manner in which the subject was presented by Professor Waldo. The Chairman, in a few eloquent remarks, proposed a vote of thanks, which was carried unanimously.

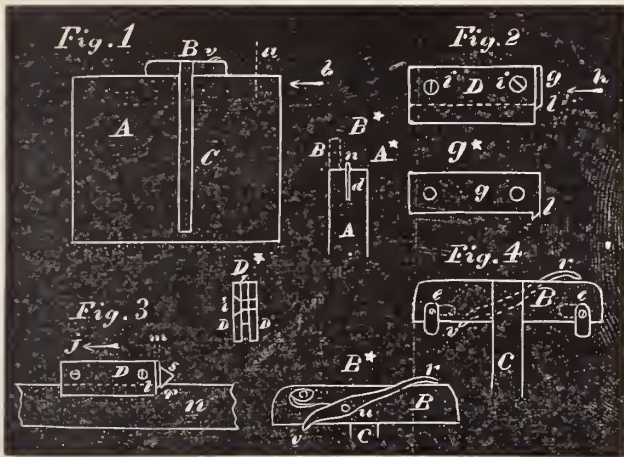
Free Hand and Mechanical Drawing.

BY EXPERT.



THE WRITER announced in last article that all future illustrations to this series would be with photo-engraved cuts, but owing to a necessary delay (too much work ahead by the engraving company), he will be compelled to use the old style with this article. It is just as well, however, as it was important soon to give some mechanical appliances for doing certain forms and kinds of mechanical drawing. No mechanical draughtsman but has experienced the

difficulty of making parallel lines for shading of perfectly even spacing. The writer gives here a complete description of a simple and cheap device by which parallel lines can be ruled rapidly, and of an evenness of spacing which will satisfy the most exacting. The arrangement is an invention of the writer, and has been used by himself and a few friends for some time and has proved perfectly satisfactory. An ordinary drawing board of any size can be used by having a groove made in the edge. This groove is quite narrow, but should be fully $\frac{3}{4}$ of an inch deep. The best way to make the groove is with a saw. Let some ingenious carpenter or cabinet maker do this part of the job. The groove should extend quite around the drawing board and should be located about $\frac{3}{8}$ of an inch below the upper surface. At *A*, fig. 1, is shown a drawing board, and at diagram *A** is shown a transverse section of the frame on the dotted line *a*, as if seen in the direction of the arrow *b*. The groove is shown at *d*. An ordinary T-square is used for ruling the lines;



this is shown at *B C*, fig. 1. We next get some pieces of printer's brass rule about 18 or 20 inches long. The length is of no particular importance, except they should be longer than the width of any space you wish to rule over in your drawing. This printer's rule should not be more than No. 24 in thickness (or $\frac{1}{32}$ of an inch), and should sink into the groove *d* so as to let $\frac{1}{8}$ of an inch protrude. This brass rule is let in so low down below the upper face of the drawing board as to permit the guide edge of the T-square to pass over it, as shown at the dotted outline *B* in diagram *A**. The portion of the brass rule which protrudes at *c* is to be ultimately cut into fine teeth like a saw, as will be shortly explained. Perhaps it may be as well to here give a general description of the device, and then go on with the details of construction. With an ordinary drawing board and T-square it is very easy with a drawing pen to produce a straight line; then, by moving the slide *B* and blade *C* (fig. 1) downward a little, we can produce a line parallel to the one first drawn, and so on by sliding *B* a little at a time we can go on producing parallel lines; the only practical difficulty being in producing these lines at exactly equal distances and getting an even tint (of lines). Now, by means of the notches in the brass rule *c* and a pawl, we can move our T-square exactly even spaces, thereby producing the lines necessary to represent a flat surface. We will now proceed to getting the teeth in our brass rule for giving us correct spacing. Undoubtedly the best way to cut these teeth would be in a dividing engine, but we can do the dividing quite well enough in the manner to be described; but for those who are willing to pay for machine cut rules, I would say send to Goodnow & Wightman, Corn Hill, Boston, Mass. For our purpose teeth made in the rule as follows will answer every purpose: Take two pieces of about No. 14 brass, $\frac{1}{2}$ an inch wide and 1 inch long, shaped as shown at *D*, fig. 2; between these go a piece of short steel a mere trifle thicker than the brass rule we intend to file into teeth; this piece is shown at diagram *g**. At diagram *D** is shown an end view of the two pieces *D*, enclosing *g* between them. These pieces are held together by two screws *i i*. At one end of the piece of sheet steel *g* is a tooth shaped as shown at *l*, diagram *g**. At *n*, fig. 3, is shown a side view of the

brass rule which we intend to place in the groove *d*, diagram *A**; in this we file a small notch at *p*, fig. 3. The idea is, we set the tooth *l* into this notch *p*, and pull *g* in the direction of the arrow *j* until firm in the notch *p*. Now, the steel piece *g* (which should be hardened) is secured between the two brass cheeks *D*, presents the end *l* as a file guide, as shown at *s*, fig. 3. As fast as a notch is filed, the tooth *l* is advanced corresponding in extent to the dotted lines at *m*. A very little practice will enable one to file a series of teeth with astonishing accuracy. We will need about 4 or 5 pieces like *g*, with different sized pieces at *l*, to enable us to file racks for inserting in *d* of different degrees of fineness. Racks for going into *d* of 4 or 5 degrees of fineness will be about all one would need for the most elaborate mechanical drawings. For racks spacing about 20, 25, 30 and 36 to an inch will be all one needs; finer than 36 to the inch are too close; and for coarser than 20 use two notches of 36 or 30. Racks with graduated spaces, where the lines come closer and closer together, such as are used to represent cylindrical surfaces, can easily be made, and the subject will be taken up again when we are speaking of such forms. It is necessary to attach two buttons to the T-square head, as shown at *e e*, fig. 4, to ensure steadiness; these can be made to turn away as shown at the dotted outlines. On the underside of the head (*B*) of the T-square is a click *v* and spring *t* for holding the head *B* in place while ruling. The method of working is quite simple, and, after one has become a little experienced, it is much more rapid than you would imagine. The best way is to set or put in the rack *n* so in the groove *d*, that the teeth will catch and hold as the head *B* is pushed from you. To illustrate, suppose we have a space, say 2x3 inches square, we wish to rule across in a drawing. We bring our T-square blade down so the top of the square space we wish to line appears above the blade (*C*), we press upward on the T-head *B*, at same time keep it pressed securely against edge of the drawing board. The click *v* catches securely in one of the teeth in the rack *n*, everything being held steady but not pressed too hard, only enough to establish security, we draw a line with our pen across our drawing. As soon as our line is complete, we draw the T-square head down so as to let the click *v* enter a new tooth or notch, and then draw another line, and so keep on until the entire surface we wish to tint is gone over. This arrangement can be used almost without care or thought and beautiful equality of tint produced. One decided advantage is the rapidity with which the work can be done, the ink not getting time to clot in the pen. Oblique lines can be ruled by using a T-square with a movable head. By having the groove *d* extend all around the board *A*, the rack *n* can be inserted and used on any side, top or bottom. In ruling oblique lines the same notches will produce closer lines. In the next article we will tell how to make rack (*n*) for cylinders.

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For further information, Application Blanks for Membership, By-Laws, etc., Address P. O. Box 3277. 170 Broadway, New York.

A special meeting of the Executive Committee was held at the office of the Alliance on May 4, attended by President Dodd, Vice-

President Sloan, Messrs. Alford, Bowden, White, Lewis, Parks and Secretary Champenois.

It being the first meeting of the newly elected officers, the Committee organized with President Dodd in the Chair, and elected Mr. J. B. Bowden Chairman for the ensuing year.

Applications from Durant & Rogers, Lowell, Mass., Morris May, Trenton, N. J., Kilian Krause, Syracuse, N. Y., J. A. Crisp, Jefferson, Ohio, Chas. Frank, Newark Valley, N. Y., Adolf Michael, Green Bay, Wis., were favorably considered and the applicants admitted to membership.

Gossip of the Month.

BEING in the salesroom of a well known clock company the other day, we were amused at hearing a gentleman ask for a seven day clock. He was in a genial mood and said: "I've got half a dozen clocks in my house, but they are either twenty-four hour or eight day clocks. I take care of them all, and have no difficulty with the twenty-four hour clocks, for I wind them the last thing before going to bed; but the eight day fellows bother me. Why are they eight day instead of seven day clocks? If they were seven day machines I could wind them every Sunday while my wife is at church doing the family worship, but I keep forgetting about the eight day arrangement, and the clocks are constaptly running down." "Why don't you try winding them every Sunday any how," was the reply. "It wont hurt them particularly if you wind them every day, and if you must have a fixed habit in the matter, you might try winding them once a week." "I never thought of that," said the customer. "I always considered a clock a mysterious piece of machinery any way, and supposed that it would upset their internal arrangements if they were interfered with except at the prescribed intervals, and I never could keep the run of the eight day winding requirements." There are hundreds of persons equally thoughtless in trifling things, to whom a piece of mechanism is a mystery seemingly beyond their comprehension. Sydney Smith, who had to have two holes cut in his door, one to let the little kittens in and out and another for the old cat, was not more obtuse than a large number of persons regarding any piece of mechanism.

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WE HAVE known so simple a thing as a fountain pen to throw intelligent men into spasms of profanity, simply because they did not understand the principle on which they are made, and, consequently, did not know enough to keep them clean and in order; when they would try to write with one, it would be clogged with dirt and dried ink, and then would follow the verbal pyrotechnics. Now, there is nothing that is such a labor-saver to one who has much writing to do as a good fountain pen; our experience teaches us that it saves at least one-third of the mechanical labor of writing, and, with the exercise of a little intelligence and care, the pen is always in order and ready to do its work for several consecutive days without replenishing, and without that everlasting annoyance of constant dipping into the ink bottle and consequent smearing of the fingers with ink. We know a number of literary men and journalists who are never without the distinguishing marks of their profession in the nature of great blotches of ink on their middle fingers and thumb. Fanny Fern once told us that she never expected to have fingers free from ink till she got to heaven. Query—Would it not be worth while for manufacturers of fountain pens to take a little trouble to explain to purchasers the principles on which their pens are constructed, and offer to help the man who gets into trouble with them?

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WHERE do all the cheap goods come from that the street venders

hawk about in the lower part of the city? Every pleasant day from one to a dozen of these peddlers take possession of the street corners, offering pocketbooks, handkerchiefs, scarfs, scarf pins, sleeve buttons, studs, penknives, pictures, etc., at wondrously low prices. They catch a considerable trade, and occasionally one finds really good bargains. A few days since one of these itinerants was selling cuff and collar buttons at one cent each, and, as we watched him for a few minutes, he must have sold at least a hundred of them; he was surrounded with such a crowd that a policeman compelled him to "move on" because he was creating a street blockade. Of course, this alleged jewelry is the brassiest of brass, but it looks bright and shiny, and, as the huckster warrants it to be "genuwine," he works off considerable of it. But the wonder is who takes the trouble to make it. There cannot be very much profit in a collar button that sells for one cent or in a scarf pin at ten cents, but, as the supply seems to be never-ending, there must be mills somewhere grinding out this cheap and nasty jewelry. It is the same stuff that is to be found in prize packages of candy, stationery, etc.

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WE BEGIN this month a series of papers by Mr. Charles E. Crossman, in which he gives the most complete history of the watch and clock making industry in this country that has ever been undertaken. His work is thorough and complete, and cannot fail to be appreciated by our readers. Mr. Crossman's familiarity with the business renders it especially appropriate for him to undertake this work, and we are glad to know that he is receiving the assistance, in his compilation, of the veterans in the business, whose recollections of the early history of this industry makes them authority upon all points connected with it. Mr. Crossman, it will be noticed, gives the credit to the pioneers of the art to which they are entitled, and to each his due meed of praise. These articles are copyrighted, and will probably be presented in book form at a future period.

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WE FEEL proud of the good work we inaugurated in the interests of the trade some two years ago, in the publication of our monthly notes on "Fashions in Jewelry." We originated the idea, employed a well known fashion writer to prepare the articles, and, after putting them in type, we have sent regularly every month advance proofs to hundreds of dealers that they might have extracts from them republished in their local papers. This has been done month after month, and the testimony to the usefulness of the work in stimulating the retail trade comes to us from all sections of the country.

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ONE of the gossips of the *Tribune*, in his items in a recent Sunday edition of that journal, had the following paragraph:

Dealers in diamonds are a sort of barometer of the business pulse. People buy diamonds when there is prosperity. Down in Maiden Lane the other day I asked a friend who is in the business how he was prospering. His reply was: "I make a sale now and then and occasionally get a good profit, but the diamond business is pretty badly cut up. You can tell something of the situation by the fact that I made a sale amounting to nearly \$25,000, on which my profits were \$200. I had the goods and had to sell them, and my competitors were so sharp, that I think I would have cut this profit in two rather than have missed the sale, which was a cash one."

That is only another way of saying that the diamond business is overdone. Probably no one in the trade will deny this, but who will name any line of business that is not overdone? Every avenue of trade, commerce and productive industry is overcrowded, while the great agricultural sections of the country are clamoring for men and labor, and the very soil is begging for some one to come and

cultivate it. But it is the tendency of our population to herd together in the great cities, and for each individual to seek his fortune in walks that promise large returns upon the smallest investment of capital and labor. Consequently all business is overdone, competition is excessive, and profits are reduced to a starvation point. The time comes when, in the language quoted, they "have to sell," and if they do not have to make an absolute sacrifice they are fortunate. There is no remedy for this except to teach the rising generation that the profession or calling of agriculture is honorable, and that the only truly independent man is he who digs his sustenance from the soil. The intelligent farmer, owning his own land, is the arbiter of his own fortunes; he has only the elements to contend with, and they are kinder than his fellow men. It would be a good thing if a law could be passed preventing any new men engaging in the old lines of trade for the next quarter of a century; there are enough already in them to last that length of time, and if the rising generation could be driven into agriculture it would be better for them, for trade and commerce and for the country. If business men who have sons to establish in life, would buy them farms instead of training them to follow them in business, they would do more to insure their future welfare than by the course so many pursue. That was a wise old philosopher who said that he who causes two blades of grass to grow where one grew before is a benefactor to his kind.

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EXPOSITIONS are growing fashionable. It is a poor sort of a town that cannot get up an exposition or a centennial celebration every year or two with which to attract and delude strangers. Europe has had an epidemic of them in the past few years, and it has not yet completed its ravages. It would never do for America to be outdone by the effete monarchies of Europe, so Chicago, St. Louis, Washington, Minneapolis and several other American cities propose to have expositions—with a very large "E"—at an early day. These are already sending out their programmes and circulars of solicitation, wherein the most extravagant promises are made for the purpose of inducing manufacturers and tradesmen to patronize them to the extent of paying for space and filling it with goods of their manufacture or in which they deal. International exhibitions, sanctioned and subsidised by governments, have unquestionably done much good to trade and commerce, stimulating enterprise and developing industry, but an exhibition capable of doing this is too big a thing for a small community to handle—nothing but government aid can carry it through successfully. When States or cities undertake them failure is the inevitable result, and exhibitors invariably share in the disaster. New Orleans furnished a notable example of this, and we venture the assertion that there was not an exhibitor there that does not rue the day he was seduced into sending his goods to that most lamentable exhibition of local incompetency and indifference. When the exhibition fit takes possession of our people again, they should make it an international affair in fact, and do it on a scale of magnificence that has never been equalled. It is popularly believed that Christopher Columbus was the first white man to get stranded on the shores of America some time in 1492, and it might be a good thing to celebrate that apocryphal event in 1892 by an international show or circus of some kind that would overshadow all its predecessors in that line. There is some talk of doing this, and we advise our readers to save up their exhibition energies for that occasion.

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IN OTHER columns we reprint from the *Journal of the Society of Arts*, the lecture delivered before that body in London by Professor Leonard Waldo, of Yale Observatory, entitled "The Mechanical Art of American Watch Making." The lecture attracted great attention

among horologists, and it was a mark of special appreciation that the full text of it was printed in the official paper of the Society. Professor Waldo's lecture will be found full of interest, and that it made a marked impression upon the assemblage of horologists that listened to it is indicated by the names of the gentlemen who discussed it at its conclusion. Professor Waldo has attained an eminence in his profession that lends importance to whatever he writes regarding it.

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ARTICLES of silver and gold have, from time immemorial, been deemed among the most appropriate gifts for wedding presents, and the more elaborately these are decorated through the goldsmiths' art the more highly they are regarded. Lapidaries are also called upon for examples of their skill on these occasions, and diamonds and other gems are usually conspicuous as wedding gifts. A wedding between persons of exalted standing or of great wealth is usually a "bonanza" to the jewelry trade. The marriage of President Cleveland at the White House early in June was no exception to the rule, and among the numerous gifts bestowed upon the bride were many examples of the jewelers' handiwork, as well as of the gold and silversmiths. There were diamonds and pearls in varied forms and settings, gold plate beautifully decorated and of the most artistic workmanship, and silverware in profusion. The Cabinet officers and the heads of departments generally sent presents of this character, as did also some of the representatives of foreign governments and many of the civilians who rank among the friends of the distinguished couple. The presents were exhibited after the reception and were greatly admired. Captious fashion critics can no longer say that wedding gifts of gold and silver or of precious stones or gems are going out of date, when they formed the most conspicuous part of the bridal gifts sent on the occasion of the first wedding that ever took place in the White House, as tokens of love and respect for the bride of the President of the United States.

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SOME months ago we printed a paragraph in these columns asking why some manufacturers did not invent a plated table knife that would cut as well as present a pleasing appearance. Probably everybody has noticed the peculiarity of the ordinary plated table knife that the edge is always so dull that it might in safety be used to slide down hill on. We suggested that if a knife could be invented that would cut food it would be a blessing to mankind. Mr. M. A. Morehouse, of Wevertown, N. Y., writes us to say that, acting upon our suggestion, he has done the thing we called for, having invented a table knife that is in general appearance similar to the ordinary plated knife, but having a steel edge that may be sharpened to any degree of keenness without destroying the plate. The photograph he sends shows a knife of such construction that looks as if it might do the necessary work satisfactorily. If it can be manufactured successfully we see no reason why it should not come into general use; the steel edge, as shown in the photograph, does not disfigure the knife, and if it will only do the requisite amount of cutting it will prove a boon, especially to that portion of the human family that is obliged to live in hotels and restaurants, to say nothing of the ordinary boarding house. Mr. Morehouse has, of course, patented his invention, and we make him no charge for the suggestion.

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IN A paragraph of THE CIRCULAR of June we published an article under the head of "Artificial Diamonds." This term is a misnomer according to the best authorities, there being no such thing as "artificial diamonds." There are imitation diamonds in large quantities, made of various substances, but experts and scientists deny that a genuine diamond was ever artificially produced. Mr. Geo. F. Kunz, a well known writer for THE CIRCULAR, is firm in his convictions

that artificial diamonds have never been produced. Our readers will doubtless remember an extended account which was brought to their notice by the press a year or two ago, reciting the fact that a chemist in Europe had discovered a means for producing diamonds artificially, and that the product of his skill had been subjected to the severest tests. This excited considerable attention at the time, but the supplement to the original statement destroyed any commercial value that might attach to such an invention, by the assertion that the infinitesimal samples which this chemist was alleged to have produced were shown to have cost about ten times as much as would genuine natural diamonds of the same size; the probability is that the whole story was an exaggeration or misstatement.

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A BILL passed the legislature at Albany at its last session doing away with imprisonment for debt. This is generally regarded as a very good thing, yet it met with considerable opposition from a certain class of business men. The law as it stood prohibited imprisonment for debt except in instances where fraud was shown to have entered into the transaction complained of, and many business men maintain that it is unwise to abolish that provision of the law. Members of the jewelry trade will call to mind numerous instances where they have been defrauded by the misrepresentations of customers. It is but a short time since that we were called upon to record the failure of several firms within a very short period, and in each case it transpired that upon the very eve of the failure of these parties they made large purchases upon false representations as to their financial standing; the whole matter was a deliberate swindle, the persons obtaining goods by deliberate lying as to their financial condition, disposing of them upon their receipt to interested friends or relatives and then announcing their insolvency. They subsequently attempted to settle with their creditors on a basis of 20 to 25 cents on the dollar. Now, if persons incurring indebtedness under such conditions do not deserve imprisonment, then our jails and prisons are built in vain. The new law, it is claimed, will serve as a stimulant to frauds of this character.

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IN OUR June issue we published one or two communications from correspondents protesting against the employment of catalogues by manufacturers and jobbers. In this issue we give place to other letters of correspondents taking the other view of the case. They argue that they derive a great amount of benefit from the catalogues sent to them from time to time by the manufacturers and jobbers, as these contain illustrations and descriptions of goods and material which are instructive and valuable to them in the prosecution of their business. The fact of the outside public getting hold of these catalogues they regard as trifling, and further say that if they do get hold of them they would be of no advantage to them without a price list, and just here is where the difficulty seems to come in. Price lists serve to enlighten the trade, yet they are equally intelligible when they fall into the hands of outsiders. If a catalogue can be separated entirely and distinctly from the price list there would seem to be little objection to the former. The circulation of catalogues is very general in nearly all branches of trade; beautifully illustrated volumes may be found scattered about promiscuously in hotels, steamboats and railroad trains, without any care being taken to have them confined to the limits of the industry to which they belong. Why it should be more objectionable for a manufacturer or a jobber of jewelry to issue a catalogue, illustrated and describing the character of his goods, than it is for a furniture manufacturer or a hardware man we fail to see. This seems to be the view of our correspondents, and we certainly have no desire to place any restraint whatever upon the orders that wholesale men may wish to give to their printers. Make the

catalogue and the price list separate and distinct, or abolish the latter entirely, and the retail trade is not likely to suffer very much from the typographical enterprise displayed by the leading houses in the trade.

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WE HAVE noticed recently advertisements of two different "watch protectors," that is to say, devices intended to prevent pickpockets from abstracting a man's watch from his pocket. One of these was in the nature of a little ball attached to the swivel, and a pull upon the chain released a number of little knives or prods, which were intended to catch either upon the clothing of the owner of the watch or to pierce the fingers of the pickpocket. The other is a rubber ball, armed with hard rubber prongs, which is passed over the bow of the watch and rests upon the pendant; it fills the pocket of the wearer and can only be released by a sharp pull upon the chain. These devices may be all well enough to prevent the abstraction of the watch from the pocket of the owner, but we judge that almost anybody would rather lose two or three watches a year than be subjected to the inconvenience that would be imposed upon him by any such slaughtering devices, for nine times out of ten the person who used it instead of the thief would be the victim of it. It is something in the nature of the burglar alarms with which many persons infest their houses, and invariably find that they go off at the wrong time and fail to go off at the right time. Besides, if the pickpockets are to be prohibited from plying their trade successfully, there will be a decrease in the demand for watches, as fewer will find their way into the melting pots and pawnshops.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

Business is undeniably dull, but not more so than the season of the year and the recent labor troubles can amply account for. It is satisfactory to note, however, that jobbers almost without exception declare that their business is quite up to, if not considerably ahead, of last year. A calm estimate of the depressing effects of the recent labor troubles on the jewelry business goes to show that it was the larger cities and not the smaller country towns which were most disastrously affected. In Chicago, for instance, business was almost in a state of stagnation during most of the month of May, or, as one leading jobber put it, "May killed us." During the last few weeks, however, the atmosphere has cleared, confidence has been re-established, and business has returned nearly to its normal condition. No jobber anticipates much for June or July, but with August nearly every jobber here has considerable confidence that a flow of steady business will set in, that will go on increasing till the end of the year. Stock is now being taken, and everything got ready for a vigorous fall trade. It is noteworthy that several large houses have only about half of their traveling men on the road and yet have suffered no appreciable decrease in their business. This, of course, is to be mainly accounted for by the circulation of so many excellent catalogues all over the country, which enable retailers to send in their own orders without the intervention of middle-men. The catalogue appears to be slowly, but surely, knocking not a few of the traveling men out of the field. Other large jobbers, however, are working their full forces on the road, and say that business is only to be got by keeping dig, digging at the retailers all the time. Collections are almost universally reported to be a little off, and this is in large measure attributed to the recent strikes. The strikes had only a partial effect in this direction in the country towns and districts, as

most of the money in such sections of the country flows into the jeweler's treasury, not from the classes that were on strike, but from the farmers. Still, the interference with freight in transit had a paralyzing effect on many lines of business, and so reacted on the jewelry trade. It is to be feared that a good many dealers, who are inclined to be dilatory in meeting their obligations, have taken an undue advantage of the strike cry in withholding their payments.

As individual opinions on the conditions and prospects of business are always of interest and value, it will not be out of place to quote a few. Otto Young & Co. declare business so far for every month of this year to be ahead of last year's figures. They do not think that the country districts have been much affected by the recent strikes and lockouts, but experience a great deal of grumbling among Chicago retailers. Benj. Allen's average is fully up to that of last year, and the firm is looking to a brisk fall trade. Cogswell & Wallis announce a considerable improvement over last year, and that with much less effort and expense. The firm has only had half of its usual traveling men on the road. They report collections slow, but not surprisingly so for the season of the year. Giles, Bro. & Co. find business steady, though a little slow, and consider it in a thoroughly healthy condition. They feel assured of a good fall trade when they expect to pick up the thread where it dropped in May. B. F. Norris, Allister & Co. say that they are now getting the flow of business which was interrupted by the strike, and that for June collections are encouraging. Their travelers in Minnesota, Indiana and Illinois are doing a satisfactory amount of business. Stein & Ellbogen are fully up to last year in their figures and anticipate a good fall trade.

The annual meeting of the Chicago Jewelers' Association was held June 1, and the following were elected officers for the ensuing year: President, Lem. W. Flershem; Vice-President, Benj. Allen; Secretary and Treasurer, H. S. Peck.

The National Association of Watchmakers and Jewelers, which reduced its initiation fee May 12 last from \$5 to \$2, is already reaping the fruit of the change in the shape of a considerable acquisition to its membership. The Secretary has just sent out an excellent circular all over the country in which the aims and advantages of the association are clearly and explicitly stated, and an urgent invitation given to all members of the trade to enter its fold and join in the movement for restoring the jewelry trade as a distinctive industry. The association still receives the indorsement of many of the leading jobbers.

The local Executive Committee of the National Association of Jobbers in Watch Cases and Movements, after full consideration of the application of Kearney & Co. to be restored to membership in the association, declined to accede to the request.

Wendell & Co., manufacturing jewelers, have now got fully installed in their capacious new premises at No. 65 and 67 Washington street, and with an increased staff of workmen are doing an excellent run of business. The same building, in which are located the important business houses of Clapp & Davies, Eppenstein, Holmes & Edwards, the Hartford Silver Plate Co. and Robert Johnson, is being fitted up with an elevator and other improvements which will make it one of the finest business blocks in the city.

Lapp & Flershem are now mailing their new material catalogue, which for size and completeness is unsurpassed by anything recently put before the trade.

B. F. Norris has just returned from San Francisco, where for some years he has been in the habit of spending the winter and spring away from the chill and frost of Chicago. He looks well and hearty, and is receiving the warm congratulations of his friends on his return to business for a season. C. H. Knights is also back in the city from a sojourn in Colorado, where he had gone for the benefit of his health, and looks much improved.

C. H. Taisey, the recently appointed local manager for Robbins & Appleton, is winning golden opinions in the West for his urbanity

and excellent business capacity. He promises to become a general favorite with the trade.

The condition and prospects of the crops, in view of the intimate relation which it bears to the business and general prosperity of the jeweler alike with every other commercial interest, is worthy of a little consideration. The fact cannot be got over that the prospects of the wheat crop in the West, and especially the Northwest, are not nearly so good as they were some little time ago. After a prolonged drouth there has been a copious rainfall, but whether the rain has come in time to be of much service to the crops is a matter of some doubt. It is certain, however, that the yield will be larger than if the dryness had continued till the end of the season. In regard to corn opinions are somewhat diverse, but it is generally held that there is time enough for improvement as regards this grain, as the corn making weather does not usually arrive till later in the season. Much encouragement may be taken from the carefully prepared government figures which indicate that the wheat crop will be ahead of that of last year by about 108,000,000 bushels. Even allowing liberal discount on these figures, there is almost a certainty that the crop will be largely ahead of last year's, which means more money in the country and better times for jewelers.

W. A. B.

Trade Matters in Providence and Vicinity.

To the Editor of the Jewelers' Circular :

The jewelry business in this city and also in Attleboro is still very much depressed, with slight indications of improvement for the coming season. It is the universal cry that business has not been so dull at this season of the year for a great many years; not only is business dull, but collections have been still worse. Notwithstanding these unfavorable features there is a general good feeling among the manufacturers; most of them are easy for money and keep up good cheer, still hopeful for a return of the good old times when orders were plentiful and prompt payments were the order of the day.

There are exceptions to the rule of dullness, as some shops are running nearly full time, but these are the favored few who have a particularly desirable class of goods to offer, and they are taking advantage of the same.

There has been a noticeable falling off in the number of failures in the jobbing trade during the past two or three months, there being but two this month, viz., F. P. Bruce, of Boston, who has petitioned in insolvency. His liabilities aggregate \$5,500, about one-half in Providence and Attleboro; assets, nominally, \$2,000. The other is that of Leroy Gardner, of Cameron, Mo., who owes about \$2,000; he has only four creditors in this district.

W. L. Petit, of Minneapolis, Minn., has been in this city endeavoring to effect a settlement proposed last month of 40 cents on the dollar. Quite a number have signified their willingness to accept, believing the failure an honest one and that the offer is the best that can be made, as in case he is forced to assign the estate could not probably pan out near that amount.

Some changes have been made in the representation of the manufacturers on the road. Mr. E. A. Warner, formerly with B. E. Daggett & Co., is now representing Clarke, Black & Co.; Mr. F. B. Lawton, formerly with G. E. Luther & Co., will hereafter represent Mr. Robert Barton in the West. Mr. Prescott O. Clarke, Jr., member of the new firm of Clarke, Black & Co., successors to Nichols, Black & Co., will represent his firm on the road. Mr. Jos. Nichols, late of Nichols, Black & Co., has joined hands with Mr. H. N. Pervear, under the name of Nichols & Pervear, and will represent the firm.

The jewelers are taking an active part in the approaching 250th anniversary of the city. A meeting of the manufacturers and representatives of this and kindred trades was held last Friday at the rooms of the Jewelers' Association, to take action for the formation of a temporary organization to represent their branch of industry in

the celebration. Mr. Geo. W. Hutchison was chosen Chairman, and John A. McCloy, Secretary. Upon motion, Messrs. Isaac L. Goff, H. S. Dorchester and Geo. L. Vose were appointed a committee to present by-laws for the government of the organization and a list of officers. The committee appointed the following named gentlemen for officers, all of whom were unanimously elected:

President, Geo. W. Hutchison; Vice-Presidents, Isaac M. Potter, Fred. I. Marcy, Alfred S. Potter, Wm. H. Luther, John Austin, Wm. R. Richards, C. Sidney Smith, O. C. Devereux, H. S. Dorchester, Ralph Hamilton, Jr., Chas. Downs, Stephen Howard, A. J. Smith, Thos. F. Arnold, Jos. F. Blood, J. B. Richardson, Horace Remington, Michael Fitzgerald, Walter Gardiner, E. Brown, Geo. L. Vose, S. K. Merrill, T. W. Foster, Frank T. Pearce, J. D. Fowler; Secretary, John A. McCloy; Treasurer, Isaac L. Goff. Executive Committee, John M. Buffinton, N. B. Barton, Chas. I. Gardiner, E. S. Dodge, H. G. Smith. Finance Committee, Silas H. Manchester, Ralph S. Hamilton, Jr., Thos. J. Gardiner, Jr., B. F. Crossin, Wm. N. Otis, Geo. H. Holmes, Sidney L. Clarke. The meeting then adjourned subject to the call of the Executive Committee.

It is the intention to exemplify the workings of a jewelry shop in all its branches, and to show the growth and improvement in the *modus operandi* for the past decade. This part of the trades' procession will, no doubt, be a pleasing feature.

We hear that the Jewelers' Board of Trade is doing good work for its members, and that under its present management it is fast developing into a first-class commercial agency, and rivaling in many respects the older established agencies. Some say the prime cause of the falling off in the failures is due to the power of the Board and the fear of the traders to transgress. Be this as it may, there is certainly an expressed opinion that a membership with the Board is a desirable adjunct to a manufacturer. Every manufacturer should become a member.

BERNARDO.

Condition of Trade in Philadelphia.

To the Editor of the Jewelers' Circular:

There is a spirit of enterprise awake in the Philadelphia trade which is bringing about great changes in the surroundings of the manufacturers and dealers. New establishments, renovations and improvements of old ones, removals to better locations, and a general looking up of matters pertaining to production and sale, have put a cheerful face upon the watchmaker's and jeweler's calling here. So rapid has been the growth in this respect within a few years, that the outlook of Philadelphia towards the position of the great jewelry center of the United States is opening widely. Taste and skill in a broad sense are very evident. There is an intention not only to *make* a setting worthy of the jewel, but to *set* it in quarters which add grace and dignity to the labor. H. Muhr's Sons, 629 and 631 Chestnut street, have finished for occupation a really splendid building at the corner of Broad and Race streets, already well known as the Muhr Building. It has a beautiful and finished front on Broad street, with wide, high windows lighting the show rooms. In the rear is the entrance to the manufactory from Race street, thus throwing all the less ornamental portion of the business out of the public sight. The building is seven stories high, with a battlemented tower at each angle, rising 114 feet from the pavement. Upon these towers are located large fire tanks, containing in all 2,000 gallons of water, and connected with each floor by fire line piping. The tower at the corner of Broad and Race is furnished with a large clock, of four faces, illuminated each night and showing the hour in unmistakable characters to the surrounding citizens. The building is of brick, with fire proof stairways throughout and a fire proof elevator. The elevator is an Otis, run by hydraulic power. The steam power required throughout the building is furnished by a Corliss engine of 124 horse power. Every possible thought and care has been

bestowed upon this structure, and it is as near perfection as is possible at this stage of the world's progress.

Bailey, Banks & Biddle, jewelers, S. E. corner 12th and Chestnut, have in prospect the erection of a large watch case manufactory at 12th and Sansom, near the present establishment. This firm is as well known as Philadelphia itself, Bailey having been a name set with gems in the minds of all Philadelphians for two generations. The firm has changed several times, but "Bailey" on the lead with each succession. They have put their new building into the hands of Messrs. Furness & Evans as architects, a sufficient guarantee of its successful evolution from paper and ink plans. S. Kind & Co., 441 and 443 Market street, have set up their name upon the present establishment very recently. They were formerly at 511 Market street, and have greatly improved their condition by removal. Their new building is light and bright and abounds in conveniences. They have added to their business as well, and have a full line of watches, watch cases and other objects of gold and silver work, and expect to further extend their stock in the direction of fine silverware. This is done under fair auspices, their salesmen judging, from present indications, that a good season awaits them.

Pfaelgar Bros. & Co., 819 and 821 Market street, are actively engaged in business. They have been adding to their already pleasant business quarters a row of fire proof safes to contain their stock of watches, etc. They have ten salesmen on the road from January to December with good returns. They have recently opened a new line of business and accepted the sole agency of an imported remedy for rheumatism, known as the Russian Rheumatic Cure. This is some degrees removed from any order of jewels, but its renown in Europe and their confidence in its efficacy, render the firm hopeful of a golden result. Chas. S. Pitman, 1313 Sansom street, G. F. C. Rosenthal, 917 Sansom street, James W. Barry, 806 Chestnut street, and others, are in expectation of a continuance of the present good business. Rosenthal's specialty is fine cluster diamond work, such as butterflies, bracelets, pins, etc.—altogether wholesale and mostly local. Barry does an active business in society badges, also the specialty of Joseph Koons, 214 Arch street. William Rawlings, Jr., 915 Arch street, is making a specialty of plain filled gold rings and diamond mountings. This branch of the trade—the filled gold rings—is also claimed as the original and special line of McCall & Newman, 625 Arch street. Their 14 and 18 Crown Stamp they say has been extensively pirated on account of its success in their hands. Hirst, Moore & White, 631 Chestnut street, are jobbers in a general line, with an improving business of which they speak hopefully. On the whole, everything in the watch making and jewelry line prospers fairly with us. The Quaker element is so near at hand, while the departure from Quaker principles is so new, that all things of such a worldly nature as jewels must present peculiar charms to Philadelphians as once forbidden, and yet must offer to purchasers an exceeding beauty and daintiness of finish with solid worth to back it. Diamonds still hold their own. Their colorless life adapts itself to every tint and quickens every toilet, however sombre, while their indestructibility, under the ordinary wear and tear of every-day use, renders them a desirable possession. At present they are more within the reach of moderate means than usual. It is an excellent time to purchase, and they are a life long beauty worth bestowing upon descendants. Many beautiful things have grown up in Philadelphia within ten years. The textile manufacturers are receiving special attention, and the art schools, industrial schools, textile schools, etc., are all bringing about greater activity in the line of costly and delicate productions. These institutions are about closing for the school year, and it is a noticeable fact that wherever the male and female of humanity contended for success, the female element came off with flying colors. Women ought to make good jewelers and watchmakers in part, and in Philadelphia, where women are always held in Quaker estimation and ranked on a line with men, they will doubtless gain all the recognition they desire.

QUAKER CITY.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

MORE ABOUT THE JOBBERS WHO SELL TO OUTSIDERS.

To the Editor of the Jewelers' Circular:

I have been greatly interested in the correspondence that has appeared in your columns, and especially at the discussion of the practice of jobbers selling goods to outsiders. There is no other practice that I know of that works so much injustice to the retail trade, for it steals away the very customers upon whom the dealers rely to enable them to pay their indebtedness to the robbers themselves. I have known repeated instances where my customers have been solicited directly by the very men of whom I buy goods, and have seen in their possession price lists identical with the ones sent me. If these jobbers competed with us on terms of equality we would have less cause of complaint, although that would be bad enough; but they sell goods to my customers on precisely the same terms they sell to me. I know where customers of mine have been sought out by the travelers for jobbing houses and induced to buy of them at retail, at wholesale prices, articles identical with those they had sold me not an hour before. If they had let these customers alone, the chances are that I should have sold them the goods at a fair profit. As it was, the traveler not only deprived me of that particular sale, but put the customer in the way of buying his goods of him in the future.

It is well for "New Blood" that he does not sign his real name, but he knew well enough that if he did so he could bid farewell to his trade with retail jewelers, for certainly no dealer would patronize a man who deliberately says that he will do all in his power to injure them. He complains that we do not do business on business principles, and that the jobbers have to carry us. If it is true that we are less expert merchants than the same class of dealers in other lines of trade, I have yet to find it out. So far from this being the case, I assert that retail jewelers are as keen, sharp business men as are to be found in any branch of business. The trouble is that the jobbers have induced so many men to go into the business without capital, that an unhealthy competition has sprung up that renders it almost impossible for retail dealers to make a living, and they are constantly under the harrow to make their payments to the very men who, like "New Blood," is willing to sell to any and every one. I maintain that it would be vastly better for the wholesale trade if the business were in the hands of a much smaller number of retail dealers, competition reduced to the minimum, and opportunity for medium profits given them. But so far from this, not only are workmen without capital induced to leave their employers and set up in business for themselves, but outsiders in any other line of business can obtain all the goods they want on the same terms that regular dealers can. This practice cannot be denounced in too vigorous terms, and I am glad to see that dealers are expressing their views freely, and also that they are taking concerted action to "boycott" those jobbers who are guilty of selling to outsiders. I say most decidedly that I will not buy of any jobber who sells to outsiders if I know it.

CASH CUSTOMER.

Syracuse, N. Y., June 15.

A DEFENCE OF CATALOGUES.

To the Editor of the Jewelers' Circular:

I beg to take issue with the correspondents whose communications have appeared in recent issues of THE CIRCULAR relative to the use of catalogues in the trade. Now, I am very eager to receive the catalogues of manufacturers or jobbers; I look upon them as invaluable; most of them are illustrated to an extent that shows us

dealers the exact character of the goods that the manufacturers produce for the trade; we can form immediately a clear idea as to how the goods look from the illustration and the description. There are comparatively few of us who have the opportunity of visiting large cities to examine the stocks in the hands of the jobbers, and we must therefore rely for our knowledge of styles upon the traveling salesmen or upon the catalogues. The salesmen who visit us are, of course, runners for their respective houses; they know no goods except those they have in their sample cases, and are not backward in claiming superiority for the lines they have with them. Unless we have some knowledge of what other goods are in the market, these commercial travelers are such "gabby fellows" that they are liable to talk us into buying exclusively from them, when, with the facts before us, we would be able to see at a glance if what they were offering us was old style and out of date. I am free to say that I rely to a very great extent upon the catalogues furnished me to keep me informed as to the goods that are in the market and of the changes of styles that are constantly going on. These catalogues, together with THE CIRCULAR, keep me very well posted. Nor do I hesitate to show these catalogues to my customers whenever they come in to look at goods and are not entirely pleased with what I have to exhibit them. I keep them convenient for reference, and have made many sales of goods selected by customers from the designs in them when I had not goods in stock. I have never found that the displaying of the catalogue to a customer interfered in any way with my sales. I think it would be a rare occasion when a customer would, after having seen a catalogue, go over the head of a retail dealer directly to the manufacturer who issued the catalogue to obtain a single article among his many products.

The evil resulting from the use of catalogues is very greatly exaggerated, in my judgment, in the communications referred to. More sales are made at retail by travelers for jobbing houses than are ever effected through the medium of jobbers' catalogues. If the commercial travelers will let the retail trade alone, I am willing to take my chances as to the circulation of the catalogues; but when you come to price lists, why then that is another matter entirely. These not only serve to direct an outsider to the manufacturer or jobber, but they give away prices, showing the profits which the retailer makes (or tries to) on his sales. But this evil has been reduced to a minimum of late, on account of the many complaints of it, so that the catalogues that I have received during the past three years have seldom had a price list attachment, and they would have been perfectly harmless documents had they fallen into the hands of an outsider. I receive, however, many price lists in separate enclosures, as an accompaniment to the catalogues, duly sealed and surrounded with all the safeguards that are thrown around any matter that passes through the mail. Even if these should fall into the hands of an outsider they would be unintelligible without a catalogue, which comes in a separate enclosure entirely, and there would not be one chance in a thousand of the two documents falling together into hands for which they were not intended.

I hope that no manufacturer or jobber will be deterred by what has been said from issuing his catalogues as heretofore, because I look upon them as an essential feature of the trade. I should not mind, however, if the price lists were abolished entirely, for the risk of their falling into improper hands is sufficiently great to counteract much of the benefit that might otherwise be derived from them. So my voice is for abolishing the price lists, but continuing the catalogues in full force.

J. M. P.

NEW BLOOD RECALCITRATES.

To the Editor of the Jewelers' Circular:

I see that your correspondents continue to criticise me for the statement made in my first letter, to the effect that as a manufacturer I am bound to sell my goods to whoever is willing to pay for them, without stopping to enquire whether he is a member of the

trade or not. Your correspondent, "J. H. M.," in your issue of last month, says that the evils attaching to the retail trade, of which I complain, are fostered and encouraged (if they are not really invented) by the manufacturers and jobbers. That is, the wholesale dealers in their anxiety to dispose of their goods, have extended credits, have introduced the practice of sending out goods on commission, and a variety of abuses too numerous to mention. Well, it may be that the manufacturers have done this; I simply take the trade as I find it. I do not pretend to locate responsibility for the conditions that exist, but believing that I cannot successfully do business in accordance with the traditions of the trade, I am going simply to recognize the present conditions and dispose of my goods to whomsoever is willing to buy. Now, I find that outsiders—the bazaar men, the dry goods merchant, and others against whom complaints are loud—are my best customers. As I said before, my profit lies in manufacturing goods in quantities, selling them as rapidly as possible, and keeping my capital moving. These outsiders come in and order large quantities, pay cash on delivery, and give me little or no trouble. They never ask for goods on memorandum, they never want samples, and they never return unsold goods after they have become shop-worn and unsalable; there is no four months' credit and four months' extension business in these transactions whatever; it is cash on the nail. My profit is small, but it is made quickly, and, buying for cash prompt, I am enabled to duplicate these small profits with considerable frequency, whereby the small profits accrue to be large ones, even more than they would be should I charge the regular dealers the customary profit. Your correspondents who assail me in this respect ignore absolutely the laws of supply and demand; these are what govern trade, and there is no escape from them. The man who has goods to sell is bound to sell them to the man who wants them and has the money to pay for them. In the olden times, when trade was more restricted than it now is, when the means of communication were limited, when there were neither railroads nor telegraphs, it was then a necessary condition of trade that goods should pass through several hands after leaving the factory before reaching the consumer. But the new facilities of communication virtually bring the trans-Mississippi States as close to New York as Albany and Buffalo were fifty years ago, and there is no reason why the retail dealer in the West should not buy directly from the manufacturer if he so chooses.

The manufacturers now-a-days take a great deal of pains to keep the trade informed as to the character of their products, and it is a simple matter for remote dealers to telegraph or write for the goods they want; it is the same with the outsiders. The changed condition of society, as well as communication, have made it desirable for merchants to carry in stock many lines of goods, hence we find the dry goods man and the bazaar man carrying stocks from which they can supply everything necessary to furnish a house or adorn the person; and these are the men who are the great merchants of the day. They see what the people want, and prepare themselves to supply the demand. They act upon the same principle as I do, and it is the cue of their success—nothing more than the old motto: "Quick sales and small profits." I have but very little respect for the old traditions of the jewelry trade, deeming them entirely inappropriate to the present wants of the people. The whole problem is summed up in the simple statement that supply will always meet demand, and that where goods are wanted they will be placed. I venture to say that there is not a wholesale merchant in New York City, in any line, who does not or will not sell his goods at retail, or who will not supply his goods to anybody who goes with the money and desires to purchase. I am aware that there are many who claim to sell exclusively to the trade, but if they did this in absolute good faith, we should hear a great deal less complaint about their goods being found in the hands of outsiders. The bazaar men of New York, Philadelphia, Boston, Chicago and other large cities have no difficulty whatever in buying any class of goods that they want, provided they can see their way to make a profit.

I occasionally hear a manufacturer declare that he would not sell to Macy, for instance, on any terms whatever, when the fact is that Macy cannot see his way to making a profit on the goods these individuals manufacture. I venture to say that if Macy wanted their goods he could get them. There is very little sentiment to be found in business. Producers put their money into their business with a view of making a profit, and the quicker they can realize upon their investment the better it is for them. Now every man is looking out for No. 1, including the retail dealers. The only difference between the average manufacturer and myself is that I openly proclaim that I am doing what they do covertly and under the rose. I venture the assertion, and I would be willing to wager something upon the event, that Macy's buyer can go into Maiden Lane and the neighboring streets visiting every jewelry house in the trade, and can buy goods if he desires from every one; and I will go further and say, that if he will make his order a liberal one, he will get a discount from their wholesale prices. This is no exaggeration, because substantially the same thing is done every day. Retail dealers will resort to any means to sell a customer who comes to him from a rival, and I have known them to sell goods at less than cost because their competitor had offered similar articles at a low price. This is cut-throat business of the worst kind, and, in my judgment, very much worse than manufacturers selling their goods to outsiders.

I have only to reiterate my former statement, that if the retail dealers expect to control the jewelry trade they have got to wake up and do business with a degree of enterprise and push in keeping with the demands of the time. They are living in a past age, and harping upon those traditions which are simply absurdities when applied to the requirements of the present time. I have had my say on this subject, and in this and my previous communication have expressed my views very clearly. I shall not recur to the subject unless forced to do so by some critic who may take exceptions in an exceptional manner.

NEW BLOOD.

New York, June 18.

ENGRAVING COFFIN PLATES.

To the Editor of the Jewelers' Circular:

Please book me for advance sheets containing the articles by "Elsie Bee." I greatly appreciate your kind offer, but could hardly believe it meant me. I wish some one, through THE CIRCULAR, would give a few ideas and designs in regard to engraving and ornamenting coffin plates.

GEO. M. MARCKRES.

Sharon, Conn., June 16.

[We will be pleased to hear from some of our correspondents in answer to the above. In small places practical jewelers are often called upon to do this kind of work, and anything to aid them will be welcome. THE CIRCULAR has printed many articles on the subject of engraving, and we have no doubt Mr. Marckres would find much useful in them by hunting them up in his back numbers.—ED.]

AN EXTRACT FROM ONE OF OUR BUSINESS LETTERS.

A dealer in Georgia says: "I missed the May issue of THE CIRCULAR, and after waiting some time in vain for it, I concluded that the fault was probably my own, and on looking up the matter I found that my subscription expired in April. I enclose two dollars for renewal, and wish to have the May and June numbers. I regard THE CIRCULAR as the best trade paper printed, and invaluable to retail dealers. I am greatly indebted to it for valuable information, and never yet read a number of it that I did not get new ideas; and I want to say to your advertisers that many of them show great ingenuity in illustrating their styles and keeping us retail dealers posted as to what goods are in the market. The fashion articles are capital, and are just the thing wanted. I notice a general improvement in the magazine within the past two years."

Foreign Gossip.

COSTLY CHURCH.—St. Peter's Cathedral, just finished at Moscow, has five cupolas, and 900 pounds of gold were used in overlaying them. The doors of the temple cost \$310,000, and the marble floors \$1,500,000.

ANTIQUITIES.—Antiquities more than 3,000 years old were lately found upon the north declivity of the Capitoline hills, Rome. This would make them of an age prior to the first settlement by Romulus and Remus.

AN INTERESTING EXPOSITION.—Magdeburg, Germany, intends to hold a grand exposition of horology in 1888, in honor of the 1,000th anniversary of horology. As nearly as can be ascertained, Pope Sylvester constructed the first wheel clock in 888.

HONORS CONFERRED.—By a decree dated February 1, 1886, His Majesty, the King of Belgium, has nominated Mr. A. H. Rodault, member of the committee on awards at the Exposition of Antwerp, and reporter of the jury at this exposition, as Chevalier of the Order of Leopold.

A VOTE OF THANKS.—Upon motion of Sir Edmund Beckett, President of the Horological Institute of England, a vote of thanks was tendered to Messrs. Tripplin and Rigg for their valuable services rendered to English horology by their efficient translation of the works of Mr. Saunier.

THE EIGHT-HOUR LAW.—The eight-hour labor agitators in Washington might find a chunk of wisdom in the remark of the practical English farmer to his experimenting landlord, who said that he did not despair of the time when he could carry the fertilizer for an acre of ground in his waistcoat pocket, that "Your honor would be able to carry the crop in the other."

HONORS CONFERRED.—Mr. Alvan Clark, of Cambridge, Mass., the famous telescope maker, has received from the Czar of Russia the honorary golden medal of the Empire, "in acknowledgement of the excellent performances of the great object glass," made for the chief observatory in the Pulkowa Observatory. This medal is seldom bestowed, and only for extraordinary services.

NEW WATCH FACTORY IN FRANCE.—A large watch factory, to employ one thousand workmen and to produce from three to five hundred watches per day, is proposed to be started at Morteau, France, near the frontier of Switzerland. It is said that a syndicate of Paris capitalists are backing the enterprise, and that the well known watchmaker, H. Haas, is to be the manager.

WATCH PRODUCTION.—The total number of watches produced annually in the entire world is estimated to be about 3,000,000. The annual production in the United States is now 1,000,000. The total number of key-winding watches made in this country since the introduction of machinery in their manufacture, or since about 1850, is 3,250,000. Probably over 2,000,000 of these were made during the last ten years.

GOOD NEWS TO DEAF PERSONS.—Baron von Lenvall, of Switzerland, has offered a prize of 3,000 francs for the best instrument constructed on the principle of the microphone, and commodious to be worn, for assisting persons hard of hearing. Instruments to be delivered by the 31st of December, 1887, to be directed to the member of the prize committee, Prof. Dr. Burkhardt-Merian, 42 St. Alban-Vorstadt, Basel.

BURGLAR SHOT.—The Paris jewelers appear to have profited by the example of the late immense burglary in the Rue Royale. A recent exchange says that a jeweler, sleeping in his store a few nights ago, heard some men operating on the outside window shutters. He armed himself with a revolver, and waited until the first put his head through the hole when he opened fire, shooting the burglar in the eye. The others ran away, and the wounded was, in a dying condition, removed to the hospital.

AN ILLUSTRIOUS WATCHMAKER DEAD.—The last of the small body of illustrious watchmakers of France died recently. Winnerl, who was a contemporary and co-laborer of Berthoud, Janvier, Breguet, etc., and the names of these artists will be renowned as long as watches and clocks are made. He was born in Steyermark in 1799, and while still a young man went to Paris, where he made very artistic watches and astronomical mechanisms for the observatory; he also rendered, for many years, valuable assistance to Francis Arago.

EXPOSITION AT GENEVA.—An international exposition is to be held at Geneva in 1888, to consist principally of horology, bijouterie, goldsmithing, fine arts and architecture. The expenses, estimated at 1,500,000 francs, will be defrayed by subsidies of the confederation, the cantons and the municipalities. In this connection the *Journal Suisse d'Horlogerie* throws down the gauntlet and says: "We hope that our American competitors will not let this opportunity escape them to show the superiority which they attribute to their products."

"IT'S AN ILL WIND, ETC."—The manufacturing jewelers have appeared as customers for the silver dollars. The recent use of coin in the ornamentation of bric-a-brac put a great number of trade dollars out of the way. The standard dollars are now used for the manufacture of locket. These ornaments are made to hold a photograph, and, when closed with a secret spring, look not at all different from the current coin. The possible blessing of the popularity is that the circulation is rid of two of the dollars for each locket made. The amount thus retired can hardly be very large, however.

AN OBSOLETE ESCAPEMENT REVIVED.—Mr. Fenon, of Gagny, France, has recently completed an excellent astronomical clock for the observatory at Marseilles, for which the constructor used Reid's spring pallet escapement, described by the latter in his work, and the clock is said to keep an extraordinarily close rate. The original regulator, containing this escapement, and made by Reid himself, is still the standard regulator at the Horological Institute. The Paris Observatory uses another regulator of the same pattern. Though yielding such an excellent record, it appears that but few of these escapements have been made, probably on account of the delicacy of adjustment required.

FIFTH CENTENNIAL JUBILEE.—Switzerland will, on July 2 of this year, celebrate the fifth centennial jubilee to commemorate the battle at Sempach. The plans for the Sempach monument, 51 in number, are exposed in the city hall. Our correspondent says that many inferior, mediocre productions are among the collection. The first price of 500 francs was awarded to Messrs. Hirsbrunner and Baumgart. The plan represents a fairly peaceable, friendly looking lion reposing upon a column, and holding the union coat-of-arms of the *Eidgenossen* (Swiss Confederacy). Critics object to it as bearing too great a resemblance to the well known monument at the harbor entrance at Lindau, on the Lake of Geneva.

AN IMMENSE CLOCK.—The works of the immense clock which has been put up in the Board of Trade building in Chicago, are pronounced a most perfect reproduction of those of the great Westminster palace clock in London, but with some additions and improvements adapted to its commercial purposes. It is constructed of iron, bronze and steel, and weighs ten tons without the bell, the latter adding some 4,500 pounds more. The pendulum alone weighs 750 pounds. In its arrangements the works are divided into a time train, a hand train and a striking train, these separate trains comprising separate machines, resting side by side on separate frames. Each of the trains is operated by a separate weight, and the three weights together reach some 3,500 pounds. The hammer that strikes the bell weighs eighty pounds; the clockwork is below the dials, which are ten feet ten inches in diameter, and the bell is above them, or 250 feet above the ground. The pendulum swings one way in two seconds.

Workshop Notes.

DIAMOND FILES.—Shape your file of brass and charge with diamond dust; grade the dust in accordance with the coarse or fine character of the file desired.

SILVER SOLDER.—A good silver solder for jewelers may be made by melting together 19 pennyweights of fine silver, 1 pennyweight of copper and 10 pennyweights of brass.

TO OXIDIZE GOLD, SILVER OR BRASS.—Paint over the parts to be oxidized with a solution of chloride of platinum, then let it dry. To make the chloride of platinum in solution, dissolve one drachm in two ounces of hot water.

REDUCING FLUXES.—In order to fuse hard smelting substances, such as stonings, bench sweepings, etc., employ a mixture of equal parts of potash, saltpeter and salt; or, three parts of sandiver, one part of potash and one part of saltpeter; or, two parts of sandiver, and one part of saltpeter; or, two parts of potash, one part of saltpeter and one part of cream of tartar.

TO WRITE ON STEEL.—Steel can be written upon or engraved by first cleaning it with oil, and then spreading a coating of melted beeswax upon it. The writing can be done on the beeswax with any sharp instrument, and the lines and marks thus made should be painted with a fine brush dipped in a liquid made of one ounce of nitric acid and one-sixth of an ounce of muriatic acid. When the written lines are filled with this liquid it should be allowed to remain five minutes, after which the article should be dipped in water and afterward cleaned.

TO PREVENT TARNISHING OF SILVER PLATE.—An excellent protective wrapper to prevent the tarnishing of silver plate goods may easily be prepared as follows: Caustic soda is dissolved in water until the hydrometer—a very simple instrument—shows 20° Beaumé. To this mixture is added oxide of zinc, until the amount reaches about two thirds the quantity of caustic soda, and the mixture is boiled until perfect solution is effected. Water is then added gradually to reduce the solution to 10° Beaumé. Into this solution summer calico, muslin or paper is dipped, and when dry it is ready for use.

POLISHING RAGS.—Nothing is better for cleaning silver than the following: Boil one ounce of finely pulverized hartshorn in one quart of water. Leave the vessel on the fire and put all the silverware into it—as much as the water will accommodate; boil for a time, take it out, drip it over the vessel and let it dry at the fire. Continue until every article has been treated in this manner. Next, place clean linen cloths in the water and let them become saturated. When taken out and dried, use them for polishing the silver. Rub the ware with the cloth and finish with soft leather. These rags are at the same time excellent for cleaning articles of brass—signs, door knobs, etc.

TO PUT IN A FUSEE TOP HOLE.—Put the pillar plate in the lathe and peg the bottom hole true; then turn out the top hole to the required size for bushing. The bouchon (a hollow one) should be small and no longer than just sufficient to form the rivet. If there be danger of bending the plate, the bouchon should be softened slightly (the hammering will re-harden it), and the ends turned hollow to facilitate the riveting. The top hole is now to be turned to nearly right size for the pivot, testing it frequently for truth with the peg, as much broaching is especially to be avoided. In finishing the bouchon use polished cutters, take off the corners of the hole and polish the cup. The same procedure is to be followed with three-quarter plate fusee, and it will be found best to finish the bouchon in fusee piece before screwing the steel on to the brass. Be careful to give the fusee but little end shake; if it be at all excessive the stopwork and the maintaining work will become uncertain, and either or both may fail.

HOW TO POLISH A WHEEL.—The wheel to be polished is laid upon a flat cork, and at first ground with a bluestone until thoroughly free from scratches. Be careful neither to touch the pinion nor the riveting with the stone. The first grinding being finished, the wheel is finally ground a second time, again laying it on a cork and grinding it with a tin file, and finally powdered bluestone and oil. The wheel is then well cleaned with a soft brush and warm soap water and polished with a polishing file. Before polishing is commenced the cork upon which the wheel is laid must be well cleaned again and covered with silk paper; also be careful, when polishing with the sword file, to do it only by short strokes and without strong pressure.

A LOW TEMPERATURE SOFT SOLDER.—A soft alloy which attaches itself so firmly to the surface of metals, glass and porcelain, that it can be employed to solder articles that will not bear a high temperature, can be made as follows: Copper dust, obtained by precipitation from a solution of the sulphate by means of zinc, is put in a cast iron or porcelain-lined mortar and mixed with strong sulphuric acid, specific gravity, 1.85. From 20 to 36 parts of the dust is taken according to the hardness desired. To the cake formed of acid and copper there is added, under constant stirring, 70 parts of mercury. When well mixed, the amalgam is carefully rinsed with warm water to remove all acid, and then set aside to cool. In 10 or 12 hours it is hard enough to scratch tin. If it is to be used now, it must be heated so hot that when worked over and brayed in a mortar it becomes as soft as wax. In this ductile form it can be spread out on any surface, to which it adheres with great tenacity when it gets cold and hard.

DRAWING THE TEMPER FROM A PINION.—When taking the temper from a pinion for pivoting, be very careful to confine the heat as much as possible to the spot necessary to be softened. If the heat is carried so far that a scale will peel off the leaves, the pinion is practically ruined, as no amount of repolishing can restore the original shape of the leaves. But a slight coloring is easily removed. Some workmen use a dilute solution of muriatic acid—two or three drops in a spoonful of water. Into this they dip for a short time the discolored part of the pinion, assisting the operation by rubbing with a piece of pegwood dipped in the same solution. Others use a similar solution of sulphuric acid in the same manner. But the use of acids on watch movements is hardly to be recommended, even in the most careful hands. A better way is to use a properly shaped piece of pegwood with fine oilstone dust, finishing with crocus. If the pinion has not been overheated the polish can easily be restored in this manner.

TO SELECT A BALANCE SPRING.—The usual way is to select a spring of as near the proper strength as we think it should be, after which it is attached to the balance staff, either with a small pellet of wax or by springing the central coil over the hub. Then put the pivot of the staff in its hole, so as to get the spring central, and grasp with the tweezers the coil that lays in the regulator pins. This gives the proper size of spring wanted; it is next to be tested as to time, which is done by resting the lower pivot on some hard, smooth surface, holding the balance upright by means of the spring in the tweezers, and counting the number of vibrations it will make in exactly one minute, or even half a minute, by the regulator. If it gives very nearly the proper number, it is pinned into the watch and tried more accurately. If correct, the central coil is cut out in such a manner that when pinned in the collet it will be near to but not touch it, and the spring will be central or concentric on the staff. Then carefully pin it in the stud, with the collet end of the spring in a straight line running from the center of the balance to the stud or nearly so. This will, in most cases, make the vibrations of the spring isochronal.

Trade Gossip.

W. A. Gray has moved from Springfield to Attalla, Ala.
 Wm. Mahan has moved from Bement to Champaign, Ills.
 Hyde & Brown succeed W. A. Hyde, Baldwin City, Kan.
 John T. Quinn has moved from Paris to Fort Smith, Ark.
 George Schoel has moved from Centreville to Buffalo, Dak.
 Owen Jones has moved from Clark, Dakota, to Calumet, Mich.
 A. K. Dorman has moved from Scranton City to Williams, Iowa.
 John A. Turner has moved from Harvard, Ills., to Oshkosh, Wis.
 S. Hollingsworth has moved from Greentown, Ind., to Los Angeles, Cal.
 G. E. Knight has moved from Centre Point, Iowa, to Madison, Neb.
 Bills & Roberts have moved from Vinton, Iowa, to Fort Smith, Ark.
 Carmichael & Co. have moved from Corning, Iowa, to Hiawatha, Kansas.
 S. F. Myers & Co. have admitted Simon Blumauer to partnership in the firm.
 D. Ashby has purchased the business of G. S. Swope, Colorado Springs, Col.
 J. O. Watts & Co. have purchased the business of B. F. Watts, Ann Arbor, Mich.
 Mr. D. L. VanMoppes will sail for Europe on the steamer *Le Bourgoyne* July 3.
 Holmes & Shinn have purchased the business of C. A. Clouser, Hartford City, Ind.
 Mr. T. LeBoutillier, of LeBoutillier & Co., arrived from Europe June 13, in the *Urania*.
 Mr. B. F. Merrill, late of Taunton, Mass., has removed to No. 40 Sutton street, Providence.
 S. F. Myers & Co. have been appointed the exclusive agents of the Terry Clock Company.
 Genicke & Casparez have recently established themselves in the jewelry business in Detroit.
 Mr. D. De S. Mendes has removed his office and diamond cutting factory to 49 Maiden Lane.
 M. N. Berg succeeds the firm of Berg & Olson, Park River, Dak., while N. K. Olson succeeds the firm at Crookston, Minn.
 The firm of Webster & Moulton, East Jordan, Mich., has been dissolved. They will each continue business on their own account.
 Roseman & Levy, Elmira, N. Y., have opened a branch in New York at 41 and 43 Maiden Lane, where they carry a full line of goods.
 Wiggins & Butters have started a jewelry manufacturing business in Detroit, and are reported to be meeting with considerable success.
 Messrs. Crossin & Tucker, of Providence, have been obliged to increase their manufacturing facilities by adding another floor to their factory.
 In accordance with the will of Joseph Stern, of Stern & Stern, the business will be continued under the old firm name, and in the same interests.
 Mr. George A. French, who has been abroad for several months purchasing diamonds for the firm of Wm. S. Hedges & Co., arrived home by the *Umbria* May 30.
 The leading wholesale and retail jewelers of Cincinnati have agreed to close their places of business at one o'clock Saturdays, from June 19 to August 28, inclusive.

Fowler Brothers, manufacturers of English crape stone jewelry, have issued an appropriate catalogue illustrating their many forms and designs in mourning jewelry.

S. W. Basset & Co. have for the Fall trade a new line of lockets, seals, buttons, gold and stone, scarf pins, etc. Many of them are of new and original designs and very attractive.

Mr. John B. Smith, of Renova, Pa., has associated his brother, James A. Smith, with him in the jewelry business, which they will continue under the firm name of Smith Brothers.

M. Wollstein, who has heretofore conducted the United States Assaying and Refining works, has admitted a partner, and the works will hereafter be conducted by M. Wollstein & Co.

The Pearl Shell Co. of Lower California and the west coast of Mexico have closed their fisheries for one year in order to allow the oysters to propagate and the shells to grow in size.

Mr. H. B. Smith, of the firm of Alfred H. Smith & Co., who has been in Europe for the past six months making purchases of diamonds for the firm, arrived home on the *Servia* May 23.

The Hampden Watch Company is now delivering to the wholesale trade their new 18-size movement, known as No 70. It is of the stem-wind grade, and the same description and price as the Hayward.

Ex-Alderman Jaehne, whose address is now at Sing Sing, used to own a jewelry store or "fence" in Broome street. Since the Alderman's retirement the business has been sold out and the store is to let.

Mr. J. M. Bonnet, of Mulford & Bonnet, returned from Europe in the steamer *Eutruria*, June 12th. While abroad, Mr. Bonnet secured many novelties and curiosities in precious stones for the Fall season.

Martin, Copeland & Co. have introduced for the Fall season, several new patterns, among which we notice a new extension seal vest chain for gentlemen, diamond mounted vests for ladies, and new designs in band rings.

Major F. R. Appleton, a son of Mr. D. F. Appleton, of the firm of Robbins & Appleton, who has been a member of the firm for about two years, will take the position vacated by Mr. S. H. Hale, in the business of the firm.

The Jeweler and Metalworker Directory, issued by J. J. Fogerty, is more complete and useful this year than any of its predecessors have been. It contains the names and addresses of all the manufacturing jewelers of the country, with apparently no exceptions.

Messrs. Louis Manheimer, J. M. Cutter, of the Elgin Company, and H. H. Butts, traveler for Jos. Fahys & Co., recently went fishing in Cedar Lake, Indiana. They were gone two days and report that they caught four hundred, but produce no affidavits to substantiate the statement.

Mr. F. M. Powers, of the firm of Smith & Powers, of Youngstown, Ohio, sailed for Europe recently on the steamer *Umbria*, with his newly made bride, *nee* Miss Gracie C. Brown, of Warren, Ohio. The happy couple will make an extended tour through Europe, returning in about four months.

A paper called *Every Saturday*, published at Elgin, Ill., last week treated its readers to a supplement containing descriptions and illustrations of the various watch factories, including the Elgin, the American, the Hampden, the Illinois, the Rockford, the Columbus, the Peoria and the Aurora.

Henry C. Germer, formerly in the employ of J. R. White, of Buffalo, was recently arrested in that city, charged with having swindled R. & L. Friedlander, of New York, out of a bill of goods. After being discharged by Mr. White, Germer ordered the goods in his name, and on their arrival, forged Mr. White's name to the receipt. The accused was sent to the workhouse for sixty days to give time for Mr. White to appear and press the charge of forgery.

A perpetual dial calendar has been patented by Mr. Charles R. Talcott, of Valparaiso, Ind. It is composed of two tablets, one a revolving dial and the other a fixed or stationary tablet, by the combination of which the day of the week or month, and the day in any given year, may be quickly and accurately ascertained.

The Hartford Silver Plate Co., and The Holmes & Edwards Silver Co., have opened an office in St. Louis, Mo., corner Locust and Eighth streets, where will be found a full line of their hollow and flat wares. This department of their business will be under the supervision of Mr. C. P. Lindley, assisted by Mr. J. W. Milford.

B. & W. B. Smith, 220 West 29th street, illustrate in their advertisement this month some original designs of show cases to which they invite the attention of the trade. This firm has fitted up the business places of a large number of the leading jewelry houses in different cities, and we cordially commend them to all who desire elegant, artistic and first-class work in fitting up their stores.

A stop watch has been patented by Mr. Eugene J. A. Dupuis, of New York city. There is a pinion on the arbor carrying the second hand, continually engaged with a wheel, loosely mounted on one of the arbors of the watch works, the loose wheel having a spring friction device, and there being other novel features to simplify construction and provide a mechanism that can be operated rapidly and exactly.

At the time of President Tyler's marriage an order came from Washington to John Lorimer Graham, then the postmaster of New-York, to purchase as a wedding gift a set of diamonds to cost not exceeding \$550. Postmaster Graham purchased the gift of Ball, Tompkins & Black, and it consisted of a cluster diamond brooch and ear rings to match with a single strand of pearls for the neck and a cluster diamond pendant.

Advertisers are continually seeking novel and striking forms for their advertisements, something that will catch the eye quickly and command attention. Barstow & Luther accomplish this by bold marks across the face of their advertisement, which might appear to many as though it were marked out by the publisher. This is not the case, however, for their advertisement, like every other in THE CIRCULAR, is paid for at our regular rates.

Mr. Wm. Bardel, of the firm of Heller & Bardel, has been elected a member of the Executive Committee of the Jewelers' League, to fill the vacancy caused by the retirement of Mr. S. H. Hale. This selection by the committee is a wise one, and the acquisition of the counsels of Mr. Bardel cannot but prove of value to the League. He is so well known in the trade that his association with the direction of the League's affairs will add to the confidence that body already enjoys.

Providence celebrated the 250th anniversary of its formation as a city June 23d and 24th. The Jewelers' Association took a prominent part in the festivities, that body having appointed a numerous committee composed of prominent jewelers to arrange for a proper representation upon the programme arranged by the city authorities. It was a grand affair, as reports to the daily press demonstrated, but we have not space to report the display made by the fraternity of jewelers on that occasion.

Mr. Otto Young, of Chicago, who has heretofore been the principal director in the Blauer Watch Case Company, has sold all his interests therein, and also the patents, to Wm. Dickinson, Wm. C. Taft and Robt. W. Patton, who will hereafter manage the company, in the positions respectively of President, Vice-President and Manager, and Secretary and Treasurer. Mr. Taft has had many years experience in the case business, and the other gentlemen are well known to the trade. The company will make a complete line of regular joint cases, gold and silver, including the albata cap cases; also a special line of invisible joint cases, which have been so well received by the trade. The company will also make a specialty of repairing cases and filling orders for special work.

In consequence of largely increasing business, Messrs. Keller & Untermeyer have been compelled to move their watch case factory to the large building, corner of Barclay and Washington sts., where, with two floors, they will be able to turn out goods as fast as wanted. They have introduced many new designs in their goods for the Fall, in diamond mounted cases, which are very attractive. They are said to have recently made the most expensive gold case ever made in this country, a lady's diamond mounted gold case, that cost \$800.

At a meeting of the Directors of the Hampden Watch Company last week Mr. John C. Dueber, of Newport, Ky., was unanimously elected a member of the Board. Mr. Dueber is largely interested in the Hampden Watch Company as a stockholder, and his large experience will enable him to render invaluable assistance in the prosecution of its business. The Hampden Company is to be congratulated on having secured the active co-operation in their business of a person so well known and possessed of so much enterprise as Mr. Dueber.

The noted "Billy" Porter, burglar, thief, etc., who was charged with having robbed the jewelry store of Marks & Son, at Troy, N. Y., several years ago of \$30,000 worth of jewelry, was arraigned before the court at Troy, June 24. A confederate named Kurtz was expected to testify against him, having been brought there from Danemora for that purpose, but at the last moment refused to testify. Porter's trial was, therefore, postponed till September. Kurtz had been previously sentenced to 18½ years' imprisonment for his share in the same robbery.

In the Fall of 1884 Webb C. Ball, of Cleveland, bought a bill of goods of William M. Fisher & Co., of Providence, giving his note for \$553. In the Spring following Mr. Ball sold his stock to his father-in-law, W. H. Young, his note not having been paid. Fisher & Co. undertook to replevin the goods, but only secured \$140 worth. Trial of the suit was recently concluded, Fisher & Co. striving to show that Mr. Ball was aware of his dissolvent condition when he bought the goods. The jury took two days to consider the evidence submitted, and then gave a verdict in favor of Mr. Ball for \$140.

Henry Nordman, aged twenty-four years, of No. 45 Essex street, was married to rosy-cheeked, black-eyed Mary Patsky by Justice Duffy, at Essex Market Police Court recently. The happy bridegroom, who is a collar button peddler, thought a fee should be paid the magistrate, and, having no money to spare, he pulled from his pocket two dozen collar buttons, and offering them to the justice whispered: "Will you please take these?" "Sell them," remarked Justice Duffy, "and buy an extra plate of ice cream for your wife." Col. Patrick Daly, the 300 pound clerk, kissed the bride and all were happy.

The death of Charles M. Lewis, of the firm of Churchill, Lewis & Wessel, occurred at his home in New Britain, Conn., May 22. Mr. Lewis was born in New Britain, where he learned the jewelry trade, first engaging in business as junior partner in the firm of Warner & Lewis. He afterwards became associated with Mr. Churchill, carrying on business with him for many years under different firm names. Mr. Lewis was a quiet, domestic man, industrious and persevering, and was highly respected by all who knew him. He was seventy years of age at the time of his death, and left a wife and two daughters.

The store of Mr. Frank Austin, of Dallas, Texas, was robbed of watches, diamonds and jewelry, valued at \$3,000, one evening in the latter part of May. Mr. Austin had locked his store at 6 o'clock to go to his dinner, leaving the electric light burning, so that a full view of the interior could be had from the street through the glass doors. When he returned at 7 o'clock the cases had been cleaned of the most valuable portion of his stock. The burglars had forced the back door and obtained an entrance, but why they were not discovered by the numerous persons passing was singular. No trace of the thieves had been ascertained at last accounts.

Mr. Peter L. Krider, manufacturer of sterling silverware, 618 Chestnut st., Philadelphia, has just finished a game cock, trimmed for fighting, which has attracted unusual attention. The bird is made of sterling silver, is mounted on the same material, and the cost will be about five hundred dollars. The work has been admired by a great many gentlemen and all pronounce it the most perfect work of art, and the truest to nature, they have ever seen. Mr. Krider has been in business thirty-six years and considers this the most difficult and artistic piece of work that he has ever turned out, it taking fully two months to do the work. The bird was made for a gentleman in New York.

Mr. Adam Daller, one of the oldest jewelers in Cincinnati, died at his home in Newport, Ky., June 18, after a long and painful illness, in the seventy-second year of his age. Mr. Daller was a native of Wellindinger, Germany, where he learned the trade of clock making. He came to this country in 1837, landing at New Orleans, where he worked at his trade a short time. Soon, however, he went to Cincinnati and established himself in business, accumulating quite a fortune. His daughter married John C. Dueber, the well-known watch case maker, and his son, Joseph Daller, is a jeweler in Cincinnati. The deceased was an industrious and competent business man, attending strictly to his own affairs, and enjoyed the confidence of all who knew him.

A very notable service of plate has just been sold in a London auction room for 1,900 guineas. It was bought early in the reign of Charles I. by Sir Christopher Harris of Radford, near Plymouth, who had the custody of Sir Walter Raleigh in 1618. Shortly after the civil war broke out, hostilities commenced in the neighborhood of Plymouth, and Sir Christopher, fearing for the safety of his plate, buried it, and presently died without having revealed the place where he had concealed it. Careful search was made, but it could not be discovered, and the loss had become a legend, when in the spring of 1827 a laborer turned up a box in a field which he was ploughing, and in it was found the long-lost Radford plate. It has now been purchased by a Norfolk squire, who is married to a member of the family of Harris of Radford.

During the recent cut in railroad rates to the Pacific Coast a number of the travelers for Eastern jewelry houses thought it would be a good thing to take a run over and work up orders. They did so, and were working the Pacific Slope for all it was worth, when an officer of the law pounced down upon them and demanded \$25 license fee from each. There was nothing for it but to walk up to the Captain's office and settle. But each victim resolved to keep his experience to himself until the "boys" had received their share, so it was not till they got back home that the matter leaked out. It is said that a dozen or more were picked up by the San Francisco authorities on account of the license "snap," and a small dealer of that city is credited with having "given them away." They all "have him on their list," and will endeavor to square accounts with him in the future.

An important fresh discovery of gold has been made in the Kimberley district of western Australia. Some gold was discovered by prospectors a couple of months since, when the *European Traveler* thus describes the rush to the district: "Four hundred ounces of gold have been brought into Derby, being the result of five parties of prospectors. The largest find of any one party was eighty-five ounces, and the largest nugget weighed nineteen ounces. The news has caused great excitement there and also in the other colonies. Two vessels laden with diggers have already left Adelaide. A vessel was chartered at Fremantle, and twenty-four hours after eighty passages had been booked, and she had accommodation for only a hundred. The vessel also takes a full cargo of horses and provisions the former of which, the latest advices state, are commanding fabulous prices. Should the field turn out to be a good one, the lucky finder will be entitled to the government reward of £5,000 for the discovery of the much-coveted metal."

During the past month the following members of the trade sailed for Europe: Tell A. Beguelin, on the *Labrador*; A. Hirsch, on the *Rynland*; A. Dominick, of Dominick & Haff, and A. Hebbard, Jr., of Hebbard & Bro., on the *Servia*; D. Blank, of Heilbron & Blank, on the *Eider*; C. N. Crump, of Shreve, Crump & Co., Boston, on the *Britannic*; Max Freund, on the *Aller*; Eugene Cuendet, of E. Jaccard Jewelry Co., St. Louis, on the *Aurania*; D. C. Jaccard, of Mermod, Jaccard & Co., St. Louis, on the *Adriatic*; H. P. Richmond, of Richmond & Co., Providence, on the *Evs*; Wm. Smith, of William Smith & Co., on the *Ethiopia*; C. G. Taylor, of Taylor & Bro., on the *Servia*; A. J. G. Hodenpyl, of Hodenpyl & Sons, sailed on the 26th, for the diamond markets of Amsterdam; Samuel Wimpfheimer, of Wimpfheimer & Zeckendorf, on the *Britannic*, and will return on the *Germanic*, July 29th.

Wm. C. Kimball, for the past sixteen years with H. F. Barrows & Co., who has spent his life up to the present time in the jewelry trade, now leaves it for another branch of business. He has recently become associated with Messrs. Strange & Brother in the silk business. Mr. Kimball has been very prominent in the jewelry business, commencing 25 years ago with Messrs. Palmer, Batchelder & Co. Boston. He was one of the incorporators of the Jewelers' League, and has been a member of the Executive Committee or a Vice-President ever since. He was also one of the organizers of the Jewelers' Security Alliance, and in fact was identified with almost every organization in the trade. The best wishes of a large circle of friends will follow him in his new position, which, if Dame Rumor be correct, is a most satisfactory one, as it certainly must have been to induce him to sever his connection with a business in which he has been so long and so prominently identified.

A rumor prevailed recently that the new firm of Glick Brothers, of Cleveland, announced as successors to Sampliner, Adler & Co., was only a blind to cover the transactions of the old firm. The suspicion that Sampliner, Adler & Co. had resumed business in this surreptitious manner caused an investigation to be started by their creditors, but if they have disguised themselves under this new firm name, their tracks have been so well covered that nothing short of legal proceedings is likely to discover the fact. Glick Brothers bought the stock of the old firm, which was appraised at \$16,000, for \$11,400 at public sale, they being the highest bidders. They paid one-third cash, the balance by notes falling due in July and November. These notes were endorsed by Cohn, Sampliner & Co., who were also endorsers on the notes of Sampliner, Adler & Co. Frank E. Dellenbaugh, representing the New York Board of Trade, investigated the transaction as far as possible, but could find no tangible evidence against Glick Brothers, who positively denied being identified with Sampliner, Adler & Co.

It may seem singular that a Republican should represent the jewelry trade in recognizing the recent marriage of the President of the United States. But such was the fact. Mr. Wm. R. Alling had in his possession an elegant cameo, representing a spread eagle, beautifully cut, and making a stone of rare beauty and value. Mr. Alling had this mounted as a charm, and sent it to President Cleveland accompanied by the following letter:

To His Excellency, Grover Cleveland, President of the United States:

DEAR SIR—The jewelers also extend to you and your bride their congratulations and wish you a long and happy life. As a memento of this happy occasion please accept the enclosed trifle from one (although not voting for you) who has admired your course as President.

Respectfully yours, WM. R. ALLING.

To which was received the following response:

Wm. R. Alling, Esq.:

MY DEAR SIR—I have received through you with much pleasure the congratulations of "The Jewelers," and in my behalf and for my wife I desire to express our thanks, and to you personally I return my sincere thanks for your beautiful gift, and the kind words which accompanied the same. Yours sincerely, GROVER CLEVELAND.

On the 24th of May last the 3,000,000th watch made by the American Watch Company or Waltham was completed. It was presented to the American Watch Company Foreman's Association, and, on the occasion of their annual banquet at Young's Hotel in Boston, the watch was drawn for. The fortunate winner was H. M. Haynes. The watch which marked the first million produced by the American Watch Company was completed in May, 1877, it having taken twenty-five years to reach this number. The 2,000,000th movement was finished in February, 1883, and 3,000,000th May 24, 1886. Thus there has been a constant increase in the production of the factory, and it bids fair to turn out a million movements a year before long. At the Foreman's banquet alluded to, when the usual festivities were enjoyed by the foremen and their guests, the following officers were chosen for the current year: John L. Keyser, President; Charles Moore, Vice-President; W. H. Wrenn, Secretary; Martin Thomas, Treasurer.

The T. A. Willson optical goods factory at Reading, Pa., gives employment to a large number of girls. Recently the Knights of Labor induced most of them to join that order with a view to obtaining control of the factory. Thereupon a notice was posted in the factory informing the girls that they must either leave the factory or resign from the Knights of Labor. After consultation with the leaders of the order about one-half of the girls quit work, but the others refused to do so, and would not recognize the orders of the Knights. The company had no difficulty in supplying the places of those who quit work, and no business embarrassment followed. The Knights had provided to take care of the strikers, and if they do so they will have a Summer's job on their hands. Members of the company declare that they have always paid liberal wages, and would have been glad to have kept their old hands, but the question was forced on them whether they or the Knights should control the factory, and, as a matter of principle, they determined to manage their own business, taking the initiative by posting the notice referred to. Their course meets general approval from the citizens of Reading.

A Newark jeweler wrote to the *Evening Post*, of New York, recently, asking if they would insert some items each week regarding jewelry in their reading columns, offering to pay \$6 a week for them. The editor published the letter with the remark that \$6 was not enough. We suggest to our Newark friend that he raise his bid twenty-five cents; it seems to be only a question of price with the editor. But we submit that the *Post* did not treat the matter fairly. It is too much to expect every business man to be familiar with the rules of a newspaper office. When notices of all kinds of dry goods, groceries, and wearing apparel, of theatres, concerts and churches, of the fashions in bonnets, gowns and trousers, are to be found day after day in our daily papers, one is not to be snubbed because he thinks such notices can be bought. Had the sum offered been up to the editor's expectations, there would have been no offer to snub the one who tendered it, nor would there have been any exhibition of cheap wit at his expense. We may say for the benefit of our Newark friend, and others who may be ignorant of the ways of metropolitan journalism, that it is not customary for the papers to insert paid notices in reading matter columns. The fashion articles in the *Post*, like those in our columns, are passing notices of existing styles, but are not advertisements, nor are they paid either in cash or "trade." Still, if the Newark gentleman had "known the ropes," he could have secured the publication of what he wanted printed in the *Post* without money and without price. Editors will do as an act of courtesy many things that they would not accept money for.

The first complimentary dinner ever given by representatives of the jewelry trade to one of their own number was tendered to Mr. S. H. Hale, so long and favorably known in connection with the American Watch Company. It has been announced that Mr. Hale was about to retire from the service on the first of July, so a few of his friends invited him to a dinner at Delmonico's, June 24. Mr. Hayes, of Wheeler, Parsons & Hayes, presided at the banquet and made an address complimentary to Mr. Hale, to which the guest of the evening responded in his usual modest but eloquent manner. Speeches were also made by Messrs. E. J. Scofield, Simon Muhr, David Keller, Major Appleton, George Bacon and R. A. Kettle. The following named gentlemen participated in the festivities of the evening: Henry Hayes, Joseph Fahys, E. J. Scofield, J. W. J. Pierson, Major F. R. Appleton, George Wilcox, Simon Muhr, David Keller, N. H. White, E. S. Smith, B. H. Knapp, Frank Simmons, George Bacon, Alfred Selman, W. H. Fitzgerald, P. K. Hills, A. M. Crommelin, S. Avery, R. A. Kettle and Fred. Leach. The menu was in Delmonico's usual style and elegant in every respect.

Reference is made in our editorial columns to the first regular meeting of the Retail Jewelers' Protective Association, held at the Cooper Union, in this city, May 27. There were over 100 dealers present, Mr. M. D. Gallagher being chosen President *pro tem.* and Mr. W. F. Engelhardt as Secretary *pro tem.* A constitution and by-laws were adopted, in which the members pledge themselves to favor with their patronage as far as possible only those manufacturers and jobbers who comply with the requirements of the Association. The following named gentlemen were elected permanent officers for the current year: President, B. Karsch; First Vice-President, P. W. Taylor, Brooklyn; Second Vice-President, A. Walter, Jersey City; Secretary, M. D. Gallagher; Treasurer, A. D. Wilson; Executive Committee: New York—Maurice Klaber, Chairman; F. A. Goeltz, Robert Lambert, J. P. Delany, Martin Grieshammer, M. L. Sheehan, A. Frankfield, and C. A. Schumacher; Brooklyn—Robert Wirth, W. F. Engelhardt, H. W. Langschmidt, John Phillips, and Emil Ader; Newark—N. J. Hartdegen; Jersey City—C. G. Rochat. It was resolved to hold meetings quarterly hereafter, the next to occur August 26.

The United States Jewelers' Guild has been formally incorporated under the laws of Kansas. Its object is stated in the articles of incorporation, to be as follows: "The object and purpose of this corporation is to aid and assist in the co-operation of the several retail jewelers' associations now or hereafter organized in the different States, for the cultivation of social relations between retail jewelers, for the diffusion of knowledge pertaining to the jewelers' art and business, for the moral elevation of the commercial standing of jewelers, for the protection of the mutual interests of the members of the aforesaid associations which this corporation shall represent, by bringing out a line of goods connected with the retail jewelry trade bearing the Guild stamp, 'an honest stamp on honest goods for honest men to sell,' which stamp no manufacturer shall be permitted to use without giving a good and sufficient bond as a guarantee and security against practising any fraud or deception under said stamp, the goods so made and stamped to be sold to none but members in good standing of some State association connected with the Jewelers' Guild of the United States, or members of the Guild as hereafter provided for; also for the establishing of a horological school, where the children and apprentices of members may have tuition and instruction in the art of watchmaking, gold and silver working, engraving and other kindred arts." The incorporators and officers are W. N. Boynton, President; C. A. Estberg, First Vice-President; J. W. Farrier, Second Vice President; H. E. Fox, Secretary and Treasurer; W. N. Boynton, C. A. Estberg, W. H. C. Rudd and S. C. Sisson, Executive Committee.



THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 189 Broadway, New York.

Advertising rates made known on application.

The Outlook for Business.

BUSINESS MEN are at all times attempting to forecast the future and seeking to predicate thereon their business enterprises. Every one studies the conditions of trade with more or less intelligence, and, upon the deductions he makes, he bases his preparations for the future. But conditions arise that are wholly unanticipated which entirely upset all calculations, and leave the prognosticators nothing but disappointment. Such was the condition this spring, when everything promised a season of unusual prosperity, and business men made their preparations accordingly; but there suddenly sprang up the labor troubles, extending into almost every line of industry, and most effectually dissipating all hope for a prosperous season in trade. Such unseen contingencies cannot be provided against, nor can they be estimated in forecasting future prospects. Aside, however, from such contingencies, the outlook for the fall trade is at present most promising—all the more so because of the sudden collapse of trade this spring. Some business men even go so far as to predict a "business boom" this fall. We sincerely hope there will be nothing of the kind; according to Webster, "to boom" is "to rush with violence," and in that sense a "business boom" is not a desirable thing to have. Trade is always healthiest when it runs smoothly, and not by fits and starts or in a jerky and unstable manner. A sudden rush of orders is sure to be followed by a reaction, as is violence in any direction, and the depression following is apt to leave us at a lower stage than it found us. The general sentiment of the trade is in anticipation of an excess

of activity in the fall, and a volume of business is expected that will place the aggregate for the year ahead of the record for several years past.

In estimating the probabilities, it is safe to say that there is no glut of manufactured goods either in the channels of distribution or in the hands of those who sell directly to the consumer. The latter in all parts of the country have bought sparingly for several years and have no surplus for the coming season. There is no great individual distress or paucity of means among consumers in any community. The families of the strikers and persons who have been in voluntary idleness feel the sore effects of their folly, but these do not constitute the classes from which the jewelry trade draws much of its patronage. The great majority of the people have been fairly prospered of late years, and have in hand the means to provide for their actual necessities and to indulge in a moderate amount of luxuries. This insures a fair demand for seasonable and desirable goods in every section of the country. Retail jewelers are not overstocked, they have been steadily reducing their indebtedness, and are in an excellent condition to meet a liberal demand for new goods when consumers are ready for them. There are no indications of a season of speculative excitement in any line, and this is a hopeful sign, for speculation is sure to be followed by reverses, and reverses insure a long period of business stagnation. What is called a "business boom" is but a speculative season of universal excitement, feverish and unhealthy in its results, and to be deplored by every person engaged in legitimate business enterprises. Speculators and gamblers may rejoice in a season of wild speculation, but the prudent business man at such times prepares for the reaction that is sure to follow. We see no indications of a special business excitement this fall, but are confident that, barring the unforeseen, there will be an increased activity in trade that will be healthy and permanent. The danger is that in their eagerness to make up for the dull times they have experienced, manufacturers and jobbers may overstock the trade, and so counteract the benefits they might otherwise derive from an active demand. Should competition be pressed by unbusinesslike methods, as it has too often been in the past, the profits that should accrue as the reward of industry and enterprise are likely to prove a minus quantity. The situation is full of promise, but it rests with the trade itself to use its opportunities judiciously and profitably.

The Degradation of Quality.

WE ARE continually hearing complaints relative to the quality of the goods now being supplied by manufacturers and introduced to the retail trade. Degradation of quality is a growing evil, and there are comparatively few houses that preserve their reputations for making fine gold goods of 14 and 18 karat in their entirety. Many of those who profess to make nothing but gold goods, will put

fine metal in the material portions of their products, but in other parts will use debased gold or even base metal lightly covered. This is due to the excessive competition in the manufacture of gold goods. It began with the cutting of prices, and this naturally and necessarily led to reducing the standard of quality, until, at the present time, it is not regarded as a very serious offence to find portions of goods sold as 14 or 18 karat fine made up partly of 8 or 10 karat gold. A gentleman dropped into a jobber's in Maiden Lane a short time since and was attracted by a nugget ring; after examining it he purchased it at a good price; the ring, however, was a trifle too large for him, and the jobber sent it out to have it cut and made smaller. The workman who was given the job sawed through the ring and was astounded to find that the wearing portion of it was entirely hollow, while the gold over the inner portion of the loop was but 10 karats fine. When this was reported to the jobber he ordered the nugget to be re-set on a substantial loop. This article was made by manufacturers who enjoy an enviable reputation for their goods, and few would suppose them capable of manufacturing sham work of this kind. Another instance was stated to us recently: A gentleman won at some athletic contest a gold badge. In company with the committee appointed to make the purchase and presentation, he purchased a \$20 gold piece, took it to the manufacturer and gave him the design for the medal. He turned out a very handsome job, one apparently entirely satisfactory. Some time after the owner of the medal injured it in some way and took it, with other pieces of broken jewelry, to the assayer to have it melted up. This was done and he was somewhat surprised when he found that the whole amount of gold assayed a trifle less than \$10. These may be extreme instances of the degradation of quality that now enters into the manufacture of jewelry, but there is no question but many manufacturers have been driven by prevailing low prices and excessive competition to scale down the quality of metal which goes into the goods produced by them.

It is not entirely the fault of the manufacturers that this is done. There is a demand for these cheaper grades of goods which seems to be encouraged and fostered by the retail trade. Travelers tell us that when presenting fine gold goods to the retail trade they are frequently asked if they cannot give them the same goods in appearance but of a lesser intrinsic value at lower prices. In fact, the demand seems to be rather for imitation goods than for genuine articles of recognized intrinsic value. This seems to us a peculiar condition of things. The retail dealer is supposed, as a rule, to fix his scale of profits at a percentage of cost, and under this arrangement his profits are no greater in selling cheap goods than they would be if he sold genuine and honest material. It is a question, too, if he would not make as many sales, with the same amount of labor, of fine goods as he does of cheaper articles. But there has of late sprung up a demand among the people for cheap goods in all lines, and there never has been a time when articles for domestic use or wearing apparel were so cheap as they are at the present time. The same is true of dry goods of all kinds, furniture, boots and shoes, and, in fact, in everything except the actual necessities of life, and for these there seems to have been no falling off in prices in many years. No doubt this cheapening of goods of all kinds comes from the introduction of machinery into almost every branch of manufacture, and the various improvements in such machinery that are being made continuously. This is true to a certain extent in the manufacture of jewelry, but there is no machinery yet invented that can make honest 18 karat goods out of 10 karat gold.

A large manufacturer of fine goods, speaking upon this point, recently said that the greatest evil that affects the jewelry trade is this degradation of quality. It is because jewelry has been made cheap that the bazaar men, dry goods merchants, hardware men and other outsiders have found it to their advantage to keep it in stock. So long as the standard of fine gold goods was maintained, no complaints were heard of outsiders carrying lines of jewelry and entering into competition with the retail trade. This manufacturer said that

the goods made by them, all of which were 14 or 18 karat fine, were imitated the moment they were put upon the market in cheaper qualities of metal, and the cheaper goods will outsell the genuine five to one. At the same time he admitted that the demand for fine goods was constantly increasing; that there is a very large class of people in the country who, having plenty of money and refined and artistic tastes, will have nothing but the best of whatever they desire. To offer them cheap goods is to drive them away at once. If one were to offer them a piece of fine jewelry and a similar article of cheap goods, to all appearances the same as the better quality, they would at once either decline to buy either specimen or would take the higher priced. The chances are, however, that they would reject the goods entirely, because of the fact that similar articles could be obtained in cheap metal. In this way manufacturers of fine goods lose a good many customers, but the demand for their products is, nevertheless, increasing. This practice of degrading quality and selling 10 karat goods with an 18 karat stamp on them, is calculated to rob the jewelry trade of all its distinctive features and to bring it to the level of any other huckstering industry. In the olden times the goldsmith and the jeweler enjoyed a most enviable reputation among the trades of the world. They were looked upon as the most trustworthy and responsible merchants in the community in which they lived; but, at the present time, when jewelry is found in the hands of the bazaar men, and the haberdasher and other outsiders, the jewelers who handle the same goods are estimated by the same standard that is applied to these outside competitors. It is unfortunate that it should be so, but the fact that it is so is due mainly to the trade itself. It is the result of excessive competition prosecuted by unbusinesslike methods which virtually force manufacturers to degrade the quality of the metal entering into their goods in order that they may sell them at the same prices their competitors do. We see no remedy for this; it is something that must cure itself, if cured at all. There are houses to-day in the trade that maintain their old standard of quality upon which they established their reputations, so that the goods that they sell will assay to the full for what it is sold for. 14 karat is the lowest quality of gold used by them, and wherever it is possible to introduce 18 karat they do so; if their goods are put into the melting pot, 14 and 18 karats in gold would be returned. Such firms have a special trade; they can scarcely maintain themselves in the general rush for business as against the debased goods, for the reason heretofore alluded to, that retail dealers will take the cheap article nine times out of ten in preference to fine goods. There is no objection to the manufacture or selling of cheap goods as such; there is a legitimate demand for goods of this quality; the only objection comes in when the cheaper goods are sold as of higher quality, and to do this fraud and misrepresentation characterize the transactions. Those guilty of them render themselves liable to prosecution for obtaining money under false pretences, should any one at any time take the trouble to institute proceedings against them, but as nobody ever does do it, such operations are likely to be continued indefinitely.

The Labor Troubles.



IN OUR issue of July we commented on the failure of the eight hour movement, and on the fact that the strikes that were so numerous in April and May had terminated disadvantageously to the strikers. Many of the strikers and boycotters in New York have since been taught a lesson that will probably make strikers less ambitious to work their spite upon non-union men or upon employers who refuse to be dictated to by their employees. Quite a number of strikers who had in various ways interfered with the street railroad lines were arrested and brought to trial for their offences. They have been found guilty in nearly every instance, and in pronouncing

sentences upon them the judges have informed them in language that cannot be mistaken, that while workmen have the right to organize for their own protection and improvement, they have no right whatever to interfere with other persons who may fill the places vacated by them or with employers who refuse to recognize their demands. The organization of musicians that boycotted Theiss (who keeps a concert saloon) because he insisted on employing non-union musicians and waiters, has lost several of its most active members, who are now serving various terms in States Prison in consequence of their actions. This was one of the most outrageous acts that occurred during the strikes. The organization of musicians boycotted Theiss' place by sending out "sandwich men" with placards to parade in front of his premises warning people not to visit it; they also sought to entice away his non-union musicians and waiters, and, in some instances, assaulted them because they persisted in working. Finally Mr. Theiss was obliged to yield to the boycotters or close his place, and then they insisted that he should pay \$1,000 for the expenses incurred by them in prosecuting the boycott! This he did, giving the money to the officers of the Musical Union and taking a receipt for it. When the strikes had quieted down Mr. Theiss presented his case to the District Attorney, who at once secured the indictment of the officers who had extorted this money from Mr. Theiss. A plain statement of facts constituted the evidence presented against them, and, after a lengthy trial, they were all sentenced to States Prison for terms varying from 2½ to 3½ years at hard labor. A dozen Bohemians who were prominent in the boycott against Mrs. Landgraff (the Polish baker) were also indicted, tried, convicted and sentenced to various terms. In all, nearly 100 strikers who were guilty of various forms of intimidation, have been sentenced to imprisonment at hard labor for various terms or fined in various sums ranging from \$10 to \$500. In every instance the court, in pronouncing sentences, has very clearly stated the point, that while the public in general would sympathize with the workmen in securing adequate compensation for their labor and in other ways seeking to improve their condition, it would resent to the uttermost any attempt to interfere by intimidation in any form with the rights of others, either to work or to employ whomsoever they pleased. The lesson has been a severe one, and the persons who have been sentenced are entitled to considerable sympathy from the fact that they were urged forward by others who are equally guilty with them and against whom no overt acts have been shown. The courts took this into consideration and did not, in any instance, accord the maximum penalty for the offences proven. Among other things the courts have held that intimidation may consist of acts that would not be offences in the individual, but, when committed as the result of combination, they become criminal; also that it is not necessary to resort to force to be guilty of intimidation. Verbal threats, printed placards, the distribution of printed circulars in the streets are acts of intimidation when done with the intention of injuring the business of another, and are punishable by fine and imprisonment. In other cities the courts have been equally rigid and vigorous in maintaining the law and sentencing strikers to various terms of imprisonment. From this it would seem that strikes, accompanied by boycotts or intimidation, ought to be at an end in this country.

But while these strikers have been receiving their deserts in the courts, other strikes have been prosecuted in various sections of the country. The most notable one was that of the switchmen on the Lake Shore Road at Chicago, which occurred early in July. There had been a strike a few weeks previous which was caused by their demanding that eight non-union switchmen should be dismissed from the employ of the company. This was refused, but the switchmen went to work notwithstanding. The non-union men were also retained in the Chicago yards which irritated the switchmen, and they again went on strike demanding the discharge of these non-union men. The company refused, and the strikers invaded the yards of the road, effectually preventing the movement of trains for a number of days. They disabled locomotives, threw trains off the

track, stoned the employees of the company, and in various other ways injured persons and property of the company. It finally became necessary, in order to move trains at all, to employ a very large force of private detectives and who were armed with Winchester rifles. The first train sent out carried one hundred or more men thus armed for the defence of the property of the road. This intimidated the strikers, and they were glad to keep out of the range of these destructive weapons. It is a sad commentary upon the State government of Illinois that it should permit railroad traffic of that State to be interfered with to this extent, and force the companies engaged in it to protect themselves at such cost and in such manner. The course of the Governor of the State was most cowardly during the strikes at East St. Louis and even more so in this latter Lake Shore strike. A few companies of militia sent to the scene of disturbance and instructed to fire ball cartridges at the first demonstration made against them, would have been a summary and a merciful way of putting an end to the disturbances and a great saving of both life and property.

The strikes of the early spring and summer proved most disastrous to the workmen engaged in them. They wanted altogether too much, demanding a decrease of the number of hours of employment and an increase of wages simultaneously, and also that none but members of their organizations should be employed to work with them. This last was the straw that broke the camel's back, arraying employers and public sentiment directly against them. Against these there was no hope of their succeeding, and finally, when they had to abandon their demands and beg for employment upon the old terms, many of them found that their services were no longer required, and that the non-union men, against whom they were so bitter, had usurped their places permanently. When the strikes were at their height the most disastrous effects were felt in the building trade. Capitalists had projected plans which would require the expenditure of many millions of dollars in the erection of buildings, and were about making the contracts for having the work vigorously prosecuted during the summer when the strikes occurred. The bold and defiant front of the strikers so intimidated employers and capitalists that building operations were suspended to a very great extent, and the millions of dollars that would have been paid out in wages were left in the banks or diverted into other channels. As a consequence of the reaction that necessarily follows all great public disturbances, we note that since the strikes failed, building contracts have been given out for from 15 to 25 per cent. less than they would have been taken for before the strikes occurred. Thus the workmen not only lost the wages they might have earned while they were idle, but they have suffered a reduction in consequence of the demoralization which followed their failure to enforce their unjust demands.

It seems to be a good time for workmen to review the situation and see where they stand; let those who were foolish enough to go on strike when the business prospects were bright, compare their situation to-day with what it was before they left their employment. Most of them will find that not only do they lose the money that they might have earned, but they become involved in debt to a very considerable extent, and the end of the year, even with steady employment from this time forward, will see them considerably worse off than they were at the beginning. The Knights of Labor that sprung up so suddenly into prominence and wore such a threatening front for many weeks, has been shorn of considerable of its power through the failure of the strikes it was backing. The workmen who had put their trust in the organization and had been deceived by the leaders, are greatly dissatisfied at the deception practiced upon them, and thousands have withdrawn from their membership in the order or have become so lukewarm that it would be impossible for the officers to secure their obedience in the future. Many retain their membership simply as a matter of policy, but in the event of new strikes being ordered by the organization it would be a matter of doubt as to how many would obey. There are dissensions among

the leaders of the order themselves, and Mr. Powderly, who was supreme at one time, has dropped considerably into the background, having lost very much of the respect that was first accorded to him because of his temperate addresses to workingmen, and the organization itself seems to have become suspicious of him. On the whole it has been an exceedingly bad year for workingmen, simply because of the bad counsel given them by the leaders of the Knights of Labor. The sooner each individual workingman determines to stand upon his individuality and his rights, and to abjure labor organizations, or at least such as are not suited to his own particular calling, the better it will be for them.

The Government, Trade and Commerce.



IT CAN scarcely be claimed by anybody that it is the duty of the government to extend special privileges to any particular branch of trade or commerce, but the governments of other countries have set us an example in some respects that might be followed to the advantage and profit of the combined industries of this country. We are suffering to-day from an over-production in nearly every line of industry for which this country is noted. This over-production has flooded our markets with goods largely in excess of the demand, and the result has been an unhealthy competition, leading to the cutting of prices, so that the margin of profit in the manufacturing business has been whittled down to a very thin edge. What we particularly need at the present time are new outlets for our industrial products, and these cannot be obtained by private enterprise alone. England, Germany and France have all appreciated this fact, and, as a consequence, they have encouraged their manufacturers and merchants to seek markets in other lands, and to enable them to do so, have subsidized steamship lines to maintain a carrying trade between those merchants who have established themselves in foreign lands and the producers at home. These countries have in this manner captured nearly the entire trade of Mexico and of the South American States. The trade thus captured should belong to the enterprising manufacturers and merchants of the United States. But because our government has discouraged our shipping interests and refuses to aid in the maintenance of lines of communication with these countries, it is almost an impossibility to sell our products in those countries in competition with the products of England, Germany and France. To-day, if one wishes to visit South America or ship goods there, it is necessary for him to patronize foreign made and managed steamships to European ports and there re-ship to South American ports. We know of one large paper house in this city that has been striving for several years to establish a trade with Brazil; the goods sent down are highly approved, and a very large trade could be established provided the means of transportation were convenient and economical. Twice a year a salesman for this house goes to Rio Janeiro, taking steamer to Liverpool and there an English steamer (that receives a liberal subsidy from the British Government) to Rio. The goods that he sends must either go by the same round about way or by sailing vessel, by which a large amount of time is consumed. The jewelry trade has at various times endeavored to establish itself there, but has met with this freight discrimination and been obliged virtually to withdraw from the field.

Experience has demonstrated that the only way to build up a trade with these distant countries successfully is to establish branch houses at the principal points where trade is solicited, but the lack of means of communication between these countries and our own have rendered it undesirable to do this. At the present time an exhibition is sailing around the world fitted out by one of the foreign governments in the interests of manufacturers and merchants of that country, and a large elegant steamship has been equipped and converted

virtually into a World's Exhibition. Upon this ship are concentrated the products of the country, with all their scientific appliances, with machinery used in manufacturing, and, in fact, with everything requisite to exhibit to other nations the progress and resources of the country that has the enterprise to send out this exhibition. It is a magnificent advertisement and the effect cannot fail to be remunerative to the industries thus represented. The United States Government is far behind almost any other nation in the aid it renders to home industries. As we said before, these industries do not want direct aid, but in their combined importance they are entitled to recognition and to such assistance as the government alone can render. We need now new markets for our products. If these could be found and a few million dollars worth of our surplus productions be sent abroad each year, it would give to trade such a stimulus as is much needed, and bring to the country a degree of prosperity that has not been known for many a year. Private enterprise cannot afford to maintain steamship lines with foreign ports from the beginning; doubtless they would be made self-sustaining in the course of a very few years, but at the start they should have something in the form of government assistance. This need not be a direct subsidy, but certain concessions to the proprietors of the lines and liberal payments for mail services would accomplish the desired result. The trade of Mexico and South America should be ours in its entirety. Prominent men who have visited these countries declare that the people there are ready to receive us with open arms, and would be very glad indeed to see our manufacturers in the field against the German, English and French merchants. It is very little to ask the government to do this, and while it has been suggested heretofore the idea has never been energetically prosecuted. Some time ago Congress appointed a commission to ascertain what might be done to improve our trade with South America, but the committee was composed entirely of politicians, who knew scarcely anything about our home industries or the requirements of commerce; necessarily their investigations were barren of results. Something was gained, however, in the recognition by Congress of the popular demand for such action, and it is possible that before many sessions have passed something practicable may be developed. With well established lines of steamships plying between the ports of this country and those of South America, they would very soon build up new markets for our industries and prove invaluable to the success of our manufacturers and business men.

Notes on a Remarkable Collection of Rough Diamonds.

[By GEORGE F. KUNZ, New York, N. Y.]

Number One.



AMONG a collection of rough diamond crystals now on exhibition at Messrs. Tiffany & Co.'s, New York, are a few worthy of special mention. The feature of the collection is that it is made up of material regardless of the price of the crystals. Mineral cabinets usually contain only diamond crystals that have little commercial value; hence many crystals exhibiting the finest and most unique forms never leave the paper, except to go to the cutter. The really fine material is seldom examined by the practical mineralogist. If he wishes to purchase, he calls for the paper of material that he can afford to select from in the hope that it may contain something of interest to him. The collection was formed by one of the largest dealers in rough diamonds in the world, who is also financially interested in South African diamond mining. With his facilities and capital he could select the best crystals, regardless of value, for if he lost enthusiasm the only sacrifice would be the interest of the money invested by him, even if he could not further realize on them as mineralogical specimens.

There is also a splendid suite, representing most of the South

African occurrences. The rock is what is commonly called "blue stuff" and crops out across the "black shale." It is a true conglomerate, formed of an altered enstatite, and is chiefly a hydrated silicate of magnesia. All through this apparently pasty mass angular fragments of the black carbonaceous shale, and those fine large sized garnets which sell as "Rubin du Cap" in Paris, are found. A very

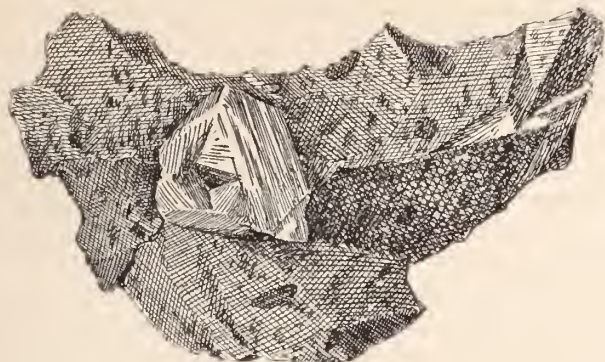


FIG. 1.

interesting associate is the chromium diopside (euklogite), a variety of pyroxene, of which there is a remarkable specimen 75 mm., 48 mm., 35 mm. This form, usually found in small pieces not over 20 mm. long, is of a rich dark green color, occurring darker here than at any other locality where it is found in gem form.

Vaalite, a hydrated mica, is also visible in a variety of forms in most of this series of specimens.

No. 4 (fig. 1) is of unusual interest. It is a fragment of a large yellowish octahedral diamond, about 30 karats in weight, and measuring 24 mm. and 22 mm. respectively, on different octahedral faces. It is 9 mm. thick on one side and 5 mm. on another. Before it was broken the crystal probably weighed from 70 to 80 karats at least.

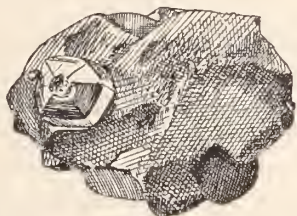


FIG. 2.

The fact that the broken side of the crystal is imbedded in the rock clearly shows that the latter is a secondary formation. (Fig. 2 is a diamond in the river conglomerate).

No. 83 is a $1\frac{1}{3}\frac{1}{2}$ karats fragment, measuring 5 mm. by 2 mm., of a whitish diamond. On its cleavage face a small group of cubes of iron pyrites is deposited, also a secondary formation, since it is partly on a cleavage surface and does not penetrate the stone.

No. 82 has some interest also. It is a dirty white, irregular crystal, measuring 9 mm. by 5 mm. by 5 mm., weighing $1\frac{1}{3}\frac{1}{2}$ karats, and deeply pitted, apparently by pressing against the surrounding matrix during formation. Three lots, embracing 20 specimens in all, are well worthy of inspection, as examples of the variety of diamond called "extreme dureté" by the French



(apparently a distinct form of the diamond). This "hard

round-bort" (fig. 3) is often called the "rolled diamond;" a palpable misnomer, since the diamond cannot be rolled. There is nothing in nature hard enough to abrade it except the diamond itself, and this is never found in sufficient quantity. Moreover, the form under consideration is quite uncommon and so excessively hard (see Science, Vol. III., No. 69, May, 1884), that it could never be abraded under any natural circumstances, not even with an entire pothole of diamonds, a very unlikely occurrence. It requires 100 days to put a slight polish on a surface 5 mm. square. For instance, "The Koh-i-noor" (with 2,000 square mm. of surface) was cut in 38 days of 12 hours each, making a total of 456 hours, while it took 1,000 hours, or nearly twice as much time, to polish the 5 mm. surface mentioned above. The wheel (14 inches in diameter) had traveled over 75,000 miles, revolved 2,800 times per minute, about the

highest rate of speed used in diamond polishing, which would make the resistance at the very least 100 times as great. (See Am. Journ. of Science, July, 1885).

This form is made up of a multiplicity of twinings of cubes or radiating agglomerations of cubes. The roughness is evidently due to the fact that the cube face in nearly all diamonds is indistinct, which was characteristic of all cases observed here.

At times, instead of twinning, cubes have been noted that were made up of an apparent fibrous grouping, resembling a round ball, but really made up of a bunching of cubes. This is the case also in



FIG. 4.

some distorted forms without this ball-like appearance; one specimen resembles a piece of putty after compressing between the fingers, one side being entirely flattened and the other somewhat convex (fig. 4).

Another interesting specimen is a piece of this round hard bort (fig. 5) with a perfect octahedron of crystallized diamond penetrating



FIG. 5.

(?) and projecting above the mass, showing that the two forms have crystallized under different conditions; also two broken masses of the same, both of which reveal a structure radiating from the center of the mass (fig. 6). As none of these have been observed in South Africa, so far as I can learn after a wide inquiry, it seems probable that both this *hard form and the cube form of diamond are peculiar to Brazil.*

The most beautiful inclusions are in lot 26. Among others are



FIG. 6.

two octahedrons and two hexoctahedrons, all white, weighing about $\frac{3}{4}$ karats each, and measuring 3 mm. in diameter, which contain large spots of a rich aurelian red inclusion from .5 to 2 mm. in size (perhaps red oxide of iron?). In addition to this these stones also contain black carbon inclusions which, contrasted with the white stone and the brilliant red, present a beautiful appearance. It is, in fact, one of the most beautiful of included mineral specimens. No. 34 is a much flattened and distorted dodecahedron, 13 mm. by 8 mm. by 3 mm. Fully



FIG. 7.

one-half of the whole center and of one side is filled with a curious, broken, almost dendritic mass of carbon, which allows the light to pass through it in many places.

In lot 31 there are 35 crystals varying in weight from $\frac{1}{4}$ to 3 karats, all dodecahedrons with curved faces, which are often irregular and broken. Nearly all of them are brown and contain carbonaceous inclusions. The most remarkable one, however, is a



FIG. 8.

flat (7 mm. by 2 mm.) crystal, almost entirely filled with a black inclusion, in three triangular divisions with interspaces of nearly equal width (fig. 7). This stone, if polished, would make a wonderful clover-leaf diamond, similar to those in the Jardin-des-Plantes and at Munich.



FIG. 8, a.

No. 50 is a beautiful, white spinel-twin, $1\frac{1}{3}\frac{1}{2}$ karats in weight, 5 mm. on each triangle and 1 mm. thick, with a round black inclusion, occupying all the center of the stone, and is a fine gem uncut (fig. 8); also a series of white spinel-twins, fig. 8a.

In lot 58 there are five examples of accidental intergrowths of pure white octahedrons. One of 6 mm. (fig. 9) has a small crystal (2 mm.) projecting from the side, and the other four representing



FIG. 9.

the same type, only less distinctly formed, show very interesting groupings of two crystals, one having a fine penetration octahedron (fig. 10).

No. 59 (fig. 10) is a fine white octahedral crystal (8 mm.) from which one face of the octahedron has been removed by cleaving. After this plate was removed an inner crystal dropped out. This inner crystal (2.25 mm.) was enclosed at an angle directly



FIG. 10.

opposite to that of the plane of cleavage, and, as several of the faces show compression, it was probably formed simultaneously with the larger crystal. And what is more interesting, one point of the octahedron has been broken at a carbonaceous inclosure in such a manner as to leave a small part of it in the larger crystal. This can be readily

seen with the glass, and appears to be a polished cube face or polished cubic cleavage started by a flaw on the surface of the small crystal. It is, however, more likely a cleavage parallel with the large crystal, showing that both crystals intergrew.

No. 61 contains 22 crystals from 3 to 9 mm. in length, weighing from $\frac{1}{4}$ to 3 karats each, which afford various examples of intergrowth and grouping, in a few cases with only a single point of contact. Again, octahedrons are piled on top of one another after the manner of gold crystals.

No. 62 contains 4 crystals, either white or yellow, that illustrate very aptly the form described by J. Hirschwald Ueber Wachstum und Zwillungsbildung am Diamant, Zeitschrift für Krystallographie Vol. 1, plate VIII, fig. 1, 1877.

At first glance these groupings would appear to be cubes. The largest is 7 mm., the others range from 3.5 (yellow) to 12.5 mm., and are a combination of the rounded hexoctahedrons with the polished octahedron.

No. 64 consists of two very interesting bunches of hexoctahedrons, forming a rosette or a remarkably perfect six-pointed star (fig. 11), 12 mm. across and 9 mm. thick. The color of this larger group is grayish white, but the smaller one is pure white.

No. 65* displays a very remarkable grouping of crystals, measuring 19 mm. by 15 mm. by 5 mm., and weighing $10\frac{1}{3}$ karats. This group is made up of at least twenty hexoctahedrons, showing the simple octahedral faces. The arrangement is apparently confused, yet the markings are very symmetrical on the whole mass, proving that they formed in the same orientation (fig. 12).

Lot 15 includes six octahedral crystals, weighing from $\frac{1}{2}$ to 1 karat, and 3 mm. to 2 in diameter, that deserve notice from their rough, granulated appearance, as if hollows had been eaten in them by acid, and afterwards filled in with some grayish black earth. These crystals bear a strong resemblance to the form of magnetite that occurs in chlorite, especially in Harford Co., Md., in which the edges of the crystals are very sharp and well defined though the faces are dull, as is the case with these crystals. On examination with the glass, however, it is readily perceived that these minute hollows in the rough surface are really smooth, and bright spots are visible, revealing an inner crystal which is white and transparent. The outer layer is gray and mixed with impurities, and there was evidently a lack of material to cover the faces completely over, so that the surface was left rough, but with a sharp and well defined crystalline form.

In No. 14 there are two octahedrons (6 mm. to 7 mm.) having a very opaque, gray crust, yet transparent internally. If this crust were removed, as is often done in diamond cleaving, octahedrons quite clear, and perhaps more than one-half the weight of the original crystals, would remain.

Among the white crystals is a suite of seven octahedrons all about 14 mm. in size. This lot weighs $90\frac{2}{3}$ karats; and some of them are almost ideal crystals in respect to form and polish of the faces. A few show slightly the development of hexoctahedron or tetrahexahedron, and one in particular has an unequal development of the hexoctahedron so as to suggest a reëntrant angle. The fine polish on the crystals is also somewhat enhanced and beautified by shallow

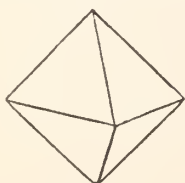


FIG. 13.

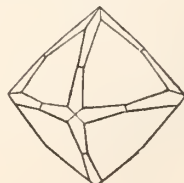


FIG. 14.

triangular depressions. Lot No. 2 presents what seems to be a rhombic dodecahedron, but in reality is an octahedron with trian-

gular octahedral faces, so raised by unequal growth as to resemble the dodecahedron, and covered with deep striations parallel to the intersection of the octahedral and dodecahedral faces. This crystal is white, transparent, weighs $11\frac{2}{3}$ karats and measures 13 mm. by 10 mm.

To appreciate fully the beauty of a natural diamond crystal, one must examine such specimens as those in lot No. 6, containing 15 crystals from 3 mm. to 5 mm. across, and lot No. 7, containing 58 crystals, weighing in the aggregate $12\frac{2}{3}$ karats and from 2 mm. to 3 mm. across. There are some crystals of such perfect whiteness as to rival those from Brazil, and are the highest type of color from the Cape. They are so resplendent that they refract light almost like cut diamonds. Here also we find the faces of the hexoctahedron and tetrahexahedron, and hexoctahedron and octahedron combined (figs. 13-14).

Lot 23 contains four beautiful examples of the octahedron described by Rose "Ueber die Diamanten"—Abh. der König. Akad. d. Wissensch., Berlin, 1876, figure 34; and J. Hirschwald Ueber Wachstum und Zwillungsbildung am Diamant, Zeit. für Krystallographie Vol. I, No. 2, 1877, figures 4-9, plate 8 (figs. 17-18). In this case the octahedral faces have been built out by unequal growth and are on a raised elevation above the hexoctahedron, which has given the crystal a divided appearance or caused depressions at all of the cube faces. The crystals measure 10 mm., 8.5 mm., and 2 are 4 mm. in

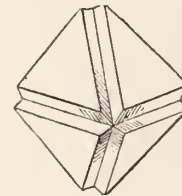


FIG. 17.

diameter, and look like the grouping of several octahedrons. One elongated hexoctahedron in lot 69 measures 9 mm., 4 mm., 1.25 mm. A rose colored twinned crystal, and one-half of it showing a curious, step-like structure (fig. 19) in lot 67.

Yellow diamonds are looked upon with disfavor by many, and rightly so when we consider the muddy and undecided shades that are termed yellow. But a moment's glance at the series of yellow

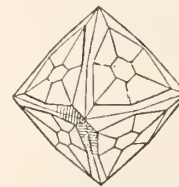


FIG. 18.



FIG. 19.

crystals in this collection cannot fail to lead every one to a more just appreciation of their beauty, and even to give them the preference over the other colors.

Starting with lot No. 8, we have 5 octahedral crystals weighing 3 karats in all and the largest crystal measuring 6 mm. They are ideal crystals in form and have only a slight yellowish tinge, coming, therefore, under the class called second white.

Lot No. 72 contains two fine canary yellow crystals, one elongated 13.10-5 mm. and the other rounded 10 mm. They are rounded hexoctahedrons with a square depression 15 mm. by 1 mm. on one cube face. In this lot, as in the preceding, the natural polish of the crystals is so remarkable that they might be worn as gems in the rough state.

The color of the 110 pink crystals in the collection varies from a very pale, transparent, and opalescent pink to a deep pink or even dark lilac color. They weigh from $\frac{1}{8}$ to 1 karat, and the faces generally observed were the octahedron, the dodecahedron, the tetrahexahedron, and the hexoctahedron. Some are crystallized, as spinel twins. Pink diamonds do not usually crystallize perfectly, nor are they transparent, as will be evident from an examination of this series.

* Von Baumhauer sur la crystallization du diamant, Plate 4, fig. 1.

In lot No. 3 there is a fine $7\frac{5}{8}$ karats crystal, measuring 23 mm. on a face and so filled with impurities as to give it a deep brown color. It is interesting from the triangular depressions on its surface, some of which are 2 mm. long and 1 mm. deep. An interesting crystal in lot No. 9, weighing $11\frac{6}{8}$ karats and 14 mm. in diameter, has on its octahedral faces, which are here raised plates almost the size of the crystal face, and on the edges showing the faces of the hexoctahedron, also peculiar triangular depressions.

Some very beautiful brown crystals are found in lot No. 19, one of which, of a rich coffee brown shade, measures 7 mm. on a face and is transparent. Several others in this series are of the same color, and some are spinel twins. Some measure only 1 mm. on a face, but nearly all are of gem value.

No. 78 is a large cleavage of a hexoctahedron, measuring 13, 9 and 5 mm., and weighing $5\frac{1}{8}$ karats. In point of color it is one of the most remarkable stones in the whole collection—a gem as it is—being really of the color of crude petroleum, deep yellowish brown. And what is still more remarkable the stone is as fluorescent as that substance. A gem cut from this stone would be very beautiful. On one of its angles is a round cavity 3 mm. long, 2 mm. wide, and 1.5 mm. deep, which was evidently produced by partial inclusion of some other material. A beautiful, pale green, distorted crystal, transparent and flawless, is in lot No. 11. Its edges are somewhat rounded; it weighs $1\frac{3}{8}$ karats, and measures 4 mm. to 8 mm. in respective lengths. The finest green crystals are in lot No. 75. They are of a very dark copperas shade and measure 2 mm. in diameter. Some of them are entirely made up of trihedral plates. The six stones weigh $\frac{3}{8}$ karats.

The fancy and odd-colored stones are in lots 73, 74 and 79. In lot 73, which contains eighteen stones, there is one rounded crystal measuring 18 mm. by 9 mm. which is transparent and of a faint absinthe green color. In lot 74, which includes 5 crystals weighing $33\frac{9}{8}$ karats, there is a distorted octahedron, 15 mm. by 17 mm. by 9 mm. The crystals in this series are all smoky green in color, and are all covered with raised and depressed triangular markings; together they form an interesting color-suite.

The cube is represented by an opaque steel-gray crystal, 4 mm. in diameter, resembling the "hard round bort" in luster. In lot No. 5 we have a series of four cubes from 2 to 4 mm. in size and weighing $11\frac{9}{8}$ karats. They are of a deep orange, almost chome yellow.

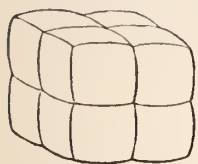


FIG. 20.

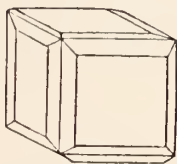


FIG. 21.



FIG. 22.

Two of them are made up of eight cubes and united in such a way as to give them the appearance of a bale of cotton (fig. 20), and the others show the faces of the tetrahexahedron well developed, the cube face being the predominant one however. There is also another lot, No. 76, of somewhat similar color. It contains 6 stones of a deep lemon yellow instead of orange, varying in size from 1 mm. to 5 mm., and weighing $8\frac{3}{8}$ karats together. The color and luster



of these two lots are almost resinous. In lot No. 8 there is a group of cubes with the tetrahexahedron (fig. 21), the color of which is an opaque grayish brown. The group measures 7 by 15 mm., one crystal being 7 mm. square. One of the gems of the collection is the spinel twin of the hexoctahedron (fig. 22). It measures 16.75 m., 18.5 m., 18 m., and is 6 mm. thick. It has depressed faces on both sides representing the octahedral face and



FIG. 23.

both these are beautifully marked with the triangular markings both raised and depressed.

No. 55 is a twinned hexoctahedron in which the one-half crystal impenetrates the other. It weighs $2\frac{1}{8}$ karats (fig. 23).†

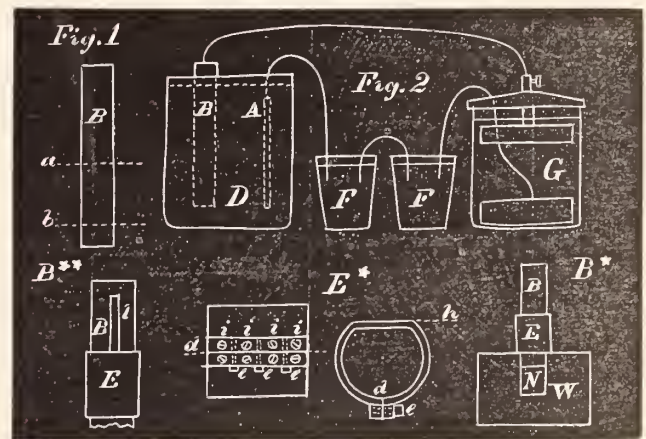
† Figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 19, 22, 23, are all natural size and drawn from the diamonds.

Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.



WE SHALL now have to provide a solution of sulphate of copper, into which we place the bar for our micrometer measuring tool on which we are to cast our copper slide. But first we shall have to flatten one side of the bar. To do this we file away one side for $\frac{1}{4}$ of an inch, testing the work in the V-shaped measuring tool we made some time since. After the filing has been conducted as far as is safe, we resort to scraping and testing on our ground glass with red lead and oil, and then grind the flat surface on our ground glass slab with emery and oil. After our testing tool tells us our work is correct we again cast on a lead band, and, in the present case, grind the bar by only sliding the band back and forth from end to end on the bar. The emery is now carefully removed by rubbing the bar with soft bread crumb. Our bar is now ready for the copper slide. Procure some black lead and grind it carefully with alcohol into a very thin paste; then add more alcohol until the black lead paint (for we are about to paint our bar with black lead) is almost as thin as water. We now apply the black lead and alcohol to one end of our bar for 3 inches with a fine camel's hair brush, in as thin a coat as we can apply and still have the bar covered. A stone earthenware jar which will hold 2 gallons should be provided to hold the sulphate of copper solution. This solution should stand for 24 hours with an excess of copper sulphate crystals in the bottom to ensure a saturated solution. After the bar is coated with black lead, we paint over all the bar we do not want the copper to be deposited upon with a solution of shellac in alcohol as shown in fig. 1, where *B* represents the bar and a space of $2\frac{1}{8}$ inches left between the lines *a b* on which no shellac is painted. There should be 3 or 4 coats of shellac applied to the bar to protect it from copper deposit. At fig. 2 is shown the arrangement of the battery *G* and depositing cell *D*. To the zinc pole of the battery attach a copper wire extending to the bar *B*, on which we wish to deposit the copper band. Opposite to the bar *B* we hang a piece of sheet copper about 2x3 inches square and connect the copper pole of the battery with it. At *F F* are shown two common tumblers of water; the use of these water



cells is simply to increase the resistance, and two such cells of simple water will intensify the current as much as several thousand feet of copper wire; two, or at most, three, tumblers will intensify our current sufficiently. Do not acidulate the water to increase its conductive power; let it remain pure water in the tumblers; just a simple arch of copper wire serves to connect one tumbler to another. The solution in *D* needs no addition of copper sulphate, as the plate *A* will be dissolved as fast as the deposit is made on the bar. The time required to deposit a band $\frac{1}{16}$ of an inch thick will probably be about 48 hours. At any rate, the copper band should not be less than $\frac{1}{16}$ of an inch thick. After the band is deposited, a hole bored into a block of hard wood which will just admit the bar but not the copper band, can be used to start the band to slide on the bar. First, however, the shellac should be removed by washing with alcohol; then oil the bar and place it with one end in the block as shown at

diagram *B**. Now, with a good heavy mallet strike *B* two or three hard blows, and, if everything has been conducted properly, the copper band will commence to slide. The copper band should be driven back and forth on the bar *B* until it can be slid with the hands, and finally made to work quite easily. We must now make a slot through from the flat face we have just made to the round hole extending through the center of our bar for attaching our slide *E* to the screw which goes into the center. The slide cast on by electro deposit, I should have said, will be a little rough and uneven, and for this reason should be at first about $\frac{1}{8}$ of an inch thick and worked down to $\frac{1}{16}$. The ends can be smoothed and finished by alternately sliding the band to first one end and then the other of the bar, and filing the band to be even with the end of the bar. In some cases the slide cast on by electro deposit refuses to move; in such a case it can be split in the center of, as shown at *d*, diagram *E**. In cutting the band care must be used to prevent marring the bar. A saw should be used until a mere film of metal remains, when the driving process shown in diagram *B** will sunder the union and the band *E* slide easily. Two flanges should be secured to the edges of the sundered band for drawing it close about the bar *B*; these will serve to also take up any wear which use may develop. These flanges are shown in diagram *E**, and each flange should be secured to *E* with 4 small screws, as shown at *i i i i*, and the two flanges closed or clasped together by 3 screws shown at *e e e*. The top of the slide *E* is finished perfectly flat for attaching the movable jaw of the measuring instrument to. In attaching this jaw great care should be used, and the holes freed from burr on the inside after they are tapped. This remark applies as well to the holes made for securing the flanges at *d*. We have taken great care in producing our band *E*, and for this reason we should also be cautious about injuring it. A sort of spoon shaped scraper can be used to remove the burr; one which will attack only the edges of the holes to be freed from burr is the kind. We have now our parts principally made, and in our next we will put them together.

Etching on Glass.



IN ANSWER to a correspondent, who desires information on the subject of etching on glass, including the various ornamental patterns, signs, decorations, etc., we take the following from Spon: Glass is etched by hydrofluoric acid gas, or by liquid hydrofluoric acid.

The acid for this purpose is obtained by treating fluoride of calcium, Derbyshire spar, with sulphuric acid in a leaden vessel, as we shall presently describe. The gaseous hydrofluoric acid has the property of producing a surface which represents ground glass in its appearance, but the liquid acid produces just the contrary effect, and dissolves away the glass, leaving the surface polished and clear. Etching glass, therefore, consists of two operations—etching by the gas, and producing a dull, opaque surface; and etching by the liquid, and producing a surface which is bright and clear.

1. Gaseous hydrofluoric acid is the product of the action of sulphuric acid and fluoride of calcium. Take powdered fluoride of calcium, two parts; sulphuric acid, three parts. The powdered fluoride is placed in a leaden dish or shallow box, and the sulphuric acid is poured upon it. By means of a stick the acid is stirred with the powdered fluoride, to form a paste; the mixture only requires to be warmed to evolve considerable fumes of gaseous hydrofluoric acid. These fumes are disagreeable, and the experiment should therefore be conducted in the open air or under a chimney. The glass plate to be etched is covered with wax by gently warming the glass sufficiently to melt wax, and rubbing it with a piece of white wax until it is covered by a thin layer; it is then allowed to cool, and the waxed surface is scratched with a graver. The sheet of glass thus prepared is used as a cover for the

leaden vessel containing the material, with the waxed side presented to the escaping fumes. These fumes will attack the glass where the wax has been removed only, and produces the dull appearance desired. The entire surface of the glass can be rendered ground in its appearance by exposing it to the fumes of the acid gas in its ordinary condition, unprotected by the wax. The production of the gas is accelerated by the warmth of a hob or of a spirit lamp applied to the bottom of the leaden vessel for a few moments.

2. To obtain the liquid acid, place the mixture named above in a leaden retort, and conduct the gas from the retort into a leaden bottom containing some water, so long as the water absorbs the fumes. The water becomes highly charged with hydrofluoric acid, and this liquid is to be used in the second process. The glass plates are to be prepared as before, with the addition of a small border of wax or putty around their edges; the liquid acid is to be poured upon the scratched wax surface and allowed to remain until a sufficient depth of etching is produced.

3. To produce a colorless pattern on a colored-glass ground, proceed as for etching an ordinary pane of glass, but the operation is conducted upon the surface of flashed glass; that is, glass which is simply covered on one of its sides with a color, and which is not stained throughout. This flashed glass is a cheap imitation of stained glass; the thin coating of colored material is soon dissolved by the acid, so as to leave a transparent or groundless pattern on a glass ground, according as the process is conducted by means of gaseous or liquid hydrofluoric acid. The acid must be carefully handled, as it attacks the skin and produces stubborn sores which are not easily healed, and it must be kept in india rubber bottles, as it will dissolve glass.

One of the *most* generally employed methods of etching at the present time is known as the sandblast. For the sandblast process a special form of apparatus is used, which, we believe, is covered by patents. The process is based upon the principle that if a stream of sand be made to fall through a vertical tube open to the air on the top, and the falling sand and air be received in a suitably closed vessel below, a jet or current of compressed air can be obtained. The entire surface of a piece of glass may be roughened by this means, or, if the parts are protected by a suitable medium, only the exposed parts will be abraded. By this means, very delicate patterns can be produced. In this connection, it should be remarked that the variety in depth of incision, which gives the chief beauty to engraved glass, cannot be gained either by etching or by the sandblast process.

Isochronism of the Balance Spring.



DOCTOR HOOKE'S motto, "*Ut tensio sic vis*" (as the tension is, so is the force), says V. Kullberg, in the *Horological Journal*, although correct is no doubt the indirect cause of the numerous misconceptions on isochronism and its adjustments which have existed ever since. We notice that Berthoud, and later on Earnshaw, believed that the force travels, "so to say," from the thin to the thick end in tapered springs; and that Leroy believed that long springs are strained less in long vibrations than short springs, and will therefore lose more in long vibrations than shorter springs; and later, the belief that the terminal curves—or short, supplementary springs, as they have been called by some—in flat over-coil or cylindrical springs, owing to the greater or less inflection of these curves, produce a greater or less force in that part of the spring; and also that flat springs should be short, and over-coil springs long, because the force of the center and fixed end is sooner reached—as if it were possible that force could be exerted in one part without affecting its every other movable part at the same time; and, last, the belief that thinning and broadening the wire in the springs produces the desired

effect. That these various beliefs have been confirmed by actual experience is quite certain and explainable, and such an explanation I venture to call the correct theory of the isochronism of the balance spring, if it holds good equally for all descriptions of springs. My opinion is this: that the isochronous adjustments simply consist in the suitable bending in or throwing out of all the inner, compared with the outer, coil in flat springs, or the suitable bending in or throwing out of the upper curve in cylindrical springs; or, in other words, a mechanical adjustment of the displacement of the coils in winding and unwinding round the center.

To explain more fully what I mean, I have found it to be a fact that, if a cylindrical theoretical spring on Professor Phillips' system, which winds perfectly true to its lower as well as its upper end, is attached to a non-expanding balance, it will be found to be equal in long and short vibrations (reducing it half turns makes no difference), owing to the uniformity of its displacement round the center; but if an ordinary large two-day expansion balance be applied instead of the non-expanding balance, it will be found that the same spring, without any alteration whatever, will now make the short vibrations from twelve to fourteen seconds fast in short vibrations; this change in the isochronism being produced through the influence of the centrifugal force on the large expansion balance. Theoretical springs are, therefore, not suitable for the large, ordinary two-day chronometer, for which reason I have sometimes used what I call broad rims, that is, stronger rims with light weights, for reducing this error. If we now observe the action of an ordinary cylindrical spring, as applied to an ordinary large two-day chronometer, and which is right in the isochronism—"that is, only two or three seconds fast in short vibrations"—we will notice how the displacement caused by the lower curve is gradually checked by the displacement caused by the upper curve in the long vibrations, until the moment of quiescence, which is the most sensitive point.

In watches where the influence of the centrifugal force, owing to the smallness of the balance, probably only amounts to perhaps three seconds (I have not tried this), and where the springs are required to be six or seven seconds fast in short vibrations, owing to the friction in side positions, we will notice how the springs must be displaced differently—that is, relax the resistance of all the inner coils compared with the outer in long vibrations; and it is for this reason that it is compulsory in flat springs that they should be pinned in full turns from the curb pins, if there be an index, or from the stud, if there be no index. To show that it is the inward and outward throw or displacement, and not merely the thinness or shortness of the spring, that produces isochronism, we need only take a watch with either thin or short spring, which is right in long and short vibrations, and shorten the spring half a turn at the inner end, when it will be found that the watch will lose considerably in the short vibrations; and if we again shorten the spring half a turn at the inner end, and make it full turns as at first, it will again be fast in short vibrations, provided no change has been made in the outer coil or in the shake in the curb pins. Here, then, is a spring which has been shortened twice, the first shortening making it slow, and the second shortening making it fast in short vibrations. By the first shortening of the spring to half turns we cause the throw of the inner coils to be in such a direction that they are checked by that of the outer coil, similarly to what takes place in the ordinary large cylindrical spring, which has to quicken the long vibrations, owing to the excessive centrifugal force of the balance.

Since theoretical springs are inclined to be equal in long and short vibrations with non-expanding balances, and the small watch balance does not appear to have sufficient centrifugal force to counteract this, would it not be advisable to only compensate the balance half-way, so as by greater thinness of rim to produce centrifugal force enough to compensate for the action of the perfectly theoretical spring? To use a comparatively less expanding metal than brass, but of equal hardness, would cause the screws to be moved farther forward, thus adding to the centrifugal force. Hardening and

tempering the steel would make it sufficiently elastic to resist handling.

These remarks are only a suggestion for obtaining the utmost perfection in the action of the spring, for, of course, every properly adjusted watch, as now made, must be made sufficiently fast in short vibrations to make it right in positions. The boastings which we sometimes hear of accomplishing the feat of making watches fast in short vibrations, clearly indicates that what I have now said on this subject is not far from the mark. The flat spring in watches is much easier to get fast in short vibrations, owing to the eccentric action of the outer coil, which, of course, is augmented by its shortness, or smallness, compared with the stud.

My remark that it is simply a question of the relative size of the spring to its stud and curb pins is an old maxim of mine, which I have thought was quite general, owing to the device that the spring, before pinning, should move freely between the curb pins into the hole of the stud.

By the above remarks, I hope that the phantom of isochronous force which has been imagined to travel up and down the spring, or to reside in certain bends or points of the spring, has been removed.

Improved Adjuster.

THE IMPROVEMENT consists in that the three clamps can by the motion of a slide be at once directed uniformly toward the circumference of a plate, and in the same manner, by letting the slide go, be brought back to the center. The watch movement is in this adjuster always seized by the clamps concentrically to the plate, which can then be rendered still more secure by the tightening of a nut, whereby the utmost degree of firmness can be obtained. The accompanying cuts represent this improved adjuster in two views. The main plate *P* with the curved guiding slots, the three clamps *k k, k*, are of the same shape and in the same arrangement to each other as in the ordinary adjuster. Underneath the main plate, however, lies a second, somewhat smaller, disc *s*, which is in the same manner provided with three, straight, oblique slots *i i, i*. The bolts of the clamp screws pass through the slots of

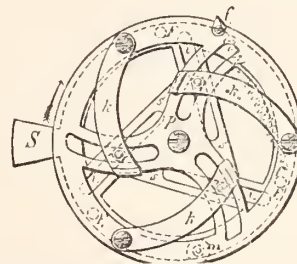


FIG. 1.

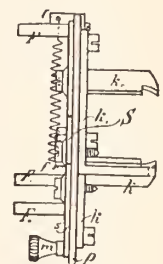


FIG. 2.

the two plates, and are only tightened sufficiently to permit of an easy motion of the clamps. The lower plate *s* is provided with a projecting piece, the slide *S*, and it will be easily seen that the clamps are moved uniformly toward the circumference of the plate, when the lower plate is by means of the slide *S* turned in the direction indicated by the arrow, but it will in the same manner move as uniformly toward the center when said slide is turned in an opposite direction. This retrograde motion takes place automatically through the influence of the cylindrical spiral spring *f f*, which is with one end fastened to the lower (movable) plate, and with the other end to the stud *f* screwed to the upper plate; *m* is a nut, serving for the tightening of the clamps. For this purpose the screw belonging thereto is fastened in the upper plate, and stands in a slot of the lower plate concentric to the center of revolution; this slot is sufficiently long to admit of the necessary motion of this

lower plate, when the nut is loosened. $F F, F_{11}$, are three ordinary feet, upon which the adjuster is placed, and are fastened to the lower plate.—*Oesterr.-Ungar. Uhrmacher Ztg.*

Optical Glass.



THE LENSES of telescopes, microscopes, and other optical instruments generally are double, and consist of two kinds of glass: flint glass and crown glass; they are, therefore, a combination of a glass containing lead, and one containing none. These two kinds are used together for the reason that, although a lead glass has to a high degree the power of refracting the light, it possesses beside this the disagreeable property of not uniformly refracting the different colored rays of light.

The light condensed through a lead glass, therefore, is surrounded with a halo playing in the different colors, whereby an exact observation is rendered difficult. This evil is partly corrected by uniting the lead glass lens with another of crown glass; although this latter kind has not as great a refractive power as flint glass, it has the property of neutralizing the dispersion of the rays of light produced by the latter, and the two together furnish an achromatized object—or, surrounded with a clear, sharp, circumference, free from colors (decomposed light). A lens of crown glass is closely placed together with a plano-concave lens of flint glass for producing an achromatic glass, or else a bi-concave flint glass is placed between two crown glass lenses.

The correct form of a lens was calculated in 1735, and practically established after many experiments; two important problems remained to be solved, however: the chemical condition of the glass, and to overcome the mechanical difficulties of its manufacture. These two problems are the greatest obstacles to solve, for which many futile experiments have been instituted for years. Purity of the glass, perfectly uniform colorization, or, more correctly, perfect want of color, transparency, and refractive power—all these are comparatively easy to the skillful optician, but it is infinitely much more difficult to produce a perfect homogeneity in the structure of the glass, and this uniform homogeneity is exactly the fundamental principle of the manufacture of glass for lenses. The difficulty is chiefly owing to the unequal specific gravity of the different silicates. During fusion the heaviest portions settle to the bottom of the pot, and the lightest rise to the surface; others, again, are more readily fusible; and, again, some solidify more quickly than others. Upon cooling, this will produce an unequal structure of the glass; the rays of light pass through media of varying density; they are in different manners refracted in the glass, and thus furnish an unclear and faulty object.

The manufacture of the flint glass substance was formerly considered the most difficult part of the task; skill in this branch, however, has advanced so far, that large quantities can be manipulated by the optician, and it is far more troublesome to procure the glass for the large crown glass lenses. This latter kind demands a far higher point of fusion than flint glass, and if the optician tries to lower it by adding alkalis, a glass is produced which will absorb moisture from the air, and therefore is perfectly useless for telescopic glasses; nor must the added quantity of alkalis be too small, else the glass on cooling is too much exposed to devitrification.

The attention of opticians and glass manufacturers was for a long time almost exclusively directed to the manufacture of flint glass, although they were successful only in rare instances in the production of faultless pieces of more than medium dimensions; the most celebrated firms, even, for instance, Marquer Roux, of St. Gobain, and Annt, of Langres, could manufacture no lenses of a diameter greater than 3 to 3½ inches. Nor were D'Artigue's glasses any larger. It was a great advance, therefore, when Guinand, a watch-

maker of Neuchatel, succeeded in casting large masses. He associated himself with Fraunhofer, the two experimented together, and after a short time they furnished lenses of 9 inches in diameter. His successors, finally, in 1824, were able to cast lenses 12 inches in diameter, and, in 1848, of 20 inches.

The essential improvement made by the elder Guinand, consisted in stirring the vitreous substance for some time, whereby the silicates were intimately mixed, and the precipitation of the heavier portion was prevented. The patent laws at that time being very imperfect, his method had to be guarded by secrecy, but others subsequently unknowingly adopted the same method. Prechtel, one of the competitors, thought that the intermixing of the differently heavy portions of glass could be effected by using a smaller pot, over which is reversed a larger one; when the mass is fusing, these pots are to be reversed at times, thus letting it run from one into the other; he adds at the same time, that it might be better to effect the intermixing by stirring with an iron rod covered with platinum. Finally, years afterward the secret was published, and the stirring apparatus was found to be a rod of the pot material, moved by an iron rod.

Bontemps, a successor of Guinand uses the following proportions for glass: 100 kilograms sand, 100 kg. minium, 30 kg. pure carbonate of soda.

Guinand's proportions are; 225 parts sand, 225 parts minium, 52 parts carbonate of potash, 4 parts borax, 3 parts saltpeter, 1 part black oxide of manganese, 1 part arsenic, and 89 parts broken glass.

The Court Antiquary of Berlin.



SMALL old manikin, still preserving his dark hair, with sedate motions and melancholy eyes, is before us. The frequenters of the Berlin art auctions know him, from the time that his son has engaged in the same branch of business, by the name of Mr. Senior.

Recently one of the assistant directors of the Trade Museum called on him for advice. Our little man stands upon a high ladder, bending the bronze arms of a gigantic crystal gas chandelier.

"I am coming in a minute doctor; only one more pressure; there! now it sits." Slowly with his gaze fixed upon the chandelier, he climbs down backward from the ladder, continually talking. "Yes, yes, gentlemen; nothing can be learned from books. Everything depends upon the hand and the eye. One glance, one pressure, and the correct shape is imparted. I know that it is good and according to taste, but leave it to you to break your heads to find out why it must be so. But, dear doctor, to what circumstance do I owe the pleasure of your visit?"

"See here, Mr. Levi, some one has offered us just now an old Dutch drinking cup, with a wonderfully scratched coat-of-arms." With these words, the young man carefully unwrapped a small package, and reverentially drew out a glass. "This has beyond question been scratched with the diamond point; is it not so Mr. Levi?"

The old man wipes his hands on the blue apron, seizes the proffered glass, and slowly turns it between his fingers. He smiles with an air of superiority.

"Wait a minute, doctor." He takes an old-fashioned key from his pocket, and opens an equally old-fashioned oak case.

"Look, this is old Levi's private collection. Don't look at it with covetous eyes; nothing of it for sale; everything is in firm hands; until I am dead. Will you see the pendant to your Dutch glass?" With these words he drew a duplicate from the upper shelf. "Do you think this has been cut with the diamond point? Not in the remotest! it has been done quite differently. The glow-coal is applied to the inner surface, and the diamond point is simply drawn over the exterior; that produces a hatching finer than the finest etching. No attempt at cutting."

"But, Mr. Levi, in the catalogue of the British Museum—" "Don't bother me with the British Museum! Write to those people, and tell them that Old Levi said it had been done in this and no other manner, and they had better correct their catalogue. But now let me show you a few things, for which you would give your life to possess them. Look at that Meissen figure."

"O, charming, Mr. Levi!"

"Do not say 'charming' or I close the door. What do you mean by 'charming?' You may call your wife 'charming,' but not my porcelain. You may feel what you like, but please do not express it."

The assistant director looks abashed, and Old Levi again opens the half-closed case doors.

"You can offend me with your 'charming,' but I'll forgive you, and show you something else, what but few people have seen." He opens a locked velvet case, and takes out a very handsome breastpin—a statuette of Frederic the Great. His thin bony hands clutch it affectionately. "See, doctor, that is my first work wrought from the first ducat I earned in Berlin. I worked in the royal palace, mounting crystal chandeliers. I received my first week's wages, among which was a bright ducat. I went home, and fashioned the bright gold piece into the statuette, in my leisure hours by the light of an oil lamp. And when it was finished, I thought to sell it to the king—and Frederic William IV—God be merciful to him—was pleased with it, and paid for it like a king. Have you ever sold your first piece of workmanship, which you wrought in the sweat of your brow, and, while at work upon it, stimulated by the one thought that it should find favor? Then you readily understand the pleasure I experienced.

"Years have passed. Fortune has remained kind to me, and I am an antiquary enjoying high renown. Frederic William IV. died, so did his widow. I was appointed registrar and taxator of the heritage. Among other trinkets, I found the breastpin, the first piece of my labor; and I assure you, doctor, I cried like a child; I desired to get the pin back, but I had not the heart to mention it, and I was compelled to see it delivered to the Hohen-Zollern Museum.

"And again years passed by; I grew to be a wealthy and a respected man. From time to time a certain member of royalty who interested himself in our art, came to me and I showed him my private collection. A beautiful Venetian glass took his fancy.

"'Levi,' he said, 'you must sell me that glass.'

"Your imperial highness must know that Old Levi sells nothing of his private collection."

"'You won't be so strict with me. I'll do you a favor some other time.'

"I remembered my breastpin. 'Your imperial highness,' I said, 'will pardon me, but I cannot sell you the glass. But you are an amiable gentleman, and will, perhaps, not scorn to effect an exchange with Old Levi.' I then told him the history of my breastpin, and that it went into the Hohen Zollern Museum, and I would like to possess it. One week thereafter the high-born gentleman had his glass, and I my breastpin, and every time when I see it I remember the time when I shaped it out of the first ducat, which I earned by my labor."

Old Levi laid the velvet box into the oaken case, and wiped the corner of his eye with his apron. When he conducted his visitor to the door, they paused at a small Rococco table, upon which stood a crystal vase with beautifully chased silver mounting.

"What a beautiful piece of work!"

"Yes, you see, doctor, I have retained the old habit of working in my leisure hours, and to make such pieces for my own amusement. Do you smoke, Doctor?"

"Certainly, Mr. Levi."

"Do you drink beer?"

"Naturally; but moderate."

"Old Levi neither smokes nor drinks, but he works in his leisure

time for his own amusement. He was once a poor goldsmith journeyman, who made a breastpin out of his first earnings; now he is a wealthy man, and chases silver vessels for his pleasure. Good-bye Doctor, call back again soon. Even if you find my Meissen figures 'charming' I'll forgive you, because you have sense, and a body can talk a sensible word with you."

Gossip of the Month.

MOST manufacturers close their factories for a week or two in the month of July for a general clearing up. The workmen count upon this, and make their arrangements for their summer "outing" at this time. At Newark, most of the factories were closed during the second and third weeks of the month, and one manufacturer told us that he presumed that during that period fully two-thirds of the workmen went off on fishing excursions. Newark is so conveniently situated that it is an easy matter for pleasure parties to reach the ocean, and it is a practice of the working jewelers to go off in parties of six, eight or a dozen, and take a cruise for a week or more. They charter a sail boat of proper dimensions to hold the party, provision it to suit them and then sail away as fancy dictates, going from one fishing ground to another, living on board, and drawing stores of health and recreation from the briny deep. There were twenty or more such parties sailed out of Newark in one week last month. The Fourth gave hundreds of the office employees in the city opportunity for similar enjoyment, and we heard of several parties that chartered sailing craft from Friday till Tuesday, and spent the intervening time on the ocean. Whether they went into some seaport to attend church on Sunday or not we were not informed.

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THE Colonial Exhibition in London has enabled the British Colonies to bring prominently before the world their varied resources and the importance of their contributions to the commerce of the world. South Africa makes an important showing because of its diamond productions. Mr. Wilmot, who is in charge of the Cape exhibits, is responsible for the statement that up to the present time there have been dug from the diamond mines of South Africa six and a half tons of diamonds, valued at \$200,000,000! Such an accumulation of precious stones was never dreamed of even by the veracious author of the Arabian Nights. What the future of these mines may be no one ventures to predict, but that their resources are not yet exhausted is demonstrated by the continuous yield. But enormous as has been this yield of brilliants, the ostrich is a more profitable "crop" at the Cape than the diamond mines. The value of the feathers plucked from this interesting insect is given as nearly \$4,000,000 a year, and, as the ostrich continually renews its feathers and reproduces its kind, there is little danger of the supply running short. Owing to the increase in numbers, the price of birds has fallen from \$1,000 to \$100 apiece, but the price of feathers remains about as high as ever. Ostrich feathers and diamonds have always been closely allied for purposes of female adornment, and that country that produces both in abundance ought to enjoy a fair share of commercial prosperity.

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A WELL known fashion writer, in a letter from Paris, states that the favorite engagement ring has a sapphire and a diamond, the two representing Faith and Constancy. Diamonds and pearls are also very desirable for engagement rings; as a matter of fact, the diamond so beautifies and sets off whatever is combined with it, that almost

any stone is appropriate for its companion. Another great advantage the diamond has lies in its adaptability to any purse, for it comes in such varied sizes and values that almost any one can afford to purchase on such an interesting and important occasion as an engagement. Without desiring to trench upon the department or the rights of our fashion editor, we venture to append here a paragraph from the letter of the Paris writer referred to. She says: "The new bracelet so much worn now is called udscha and is of Egyptian origin. It was worn more than three hundred years ago as a talisman by both men and women in Egypt. The udscha itself is a large coin covered with hieroglyphics in enamel or jeweled, and this is attached to a narrow metal and must never be removed from the wearer's arm. Hence it was customary to wear it in youth, or as long as the size of the arm would permit, above the elbow as near the arm-pit as possible. As the wearer grew, increased in muscle or fat, the udscha was slipped lower and lower until it descended to the wrist."

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THIS government of ours is somewhat slow sometimes and not always posted as to the markets. Probably this is due to the superfluous quantity of red tape that surrounds all its affairs, tending to keep it in a rut from which it has not enterprise enough to extricate itself. Some time ago—was it before the flood?—it declared that the value of an ounce of silver was \$1.11, and that valuation it adheres to in spite of the fluctuations of the market. Many dealers in the mining regions are in the habit of buying gold and silver as a regular part of their business. They frequently send it on here in its natural state to their correspondents with instructions to have it assayed at the government assay office and credit their accounts with the proceeds. This being done, the correspondent receives from the government assayer to the effect the yield was so many ounces of silver, which at \$1.11 an ounce, amounts to so much. The market price for silver, however, has been \$1 or less for a long time, and the discrepancy between the official statement and what may be actually realized on the shipment has to be explained to the shipper. A shipper of silver who had complained that his correspondent had not credited him with the amount certified to by the government, was in the city recently and had the opportunity to learn "how it was himself." With the government assay and the silver in his pocket he went into the market to sell, and found the prevailing rate for silver discounted the government valuation by a considerable. He concluded that his correspondent was not swindling him to any very great extent, and that it simplified his business considerably to make his sales through him. If the government would only buy silver at its own valuation it would be a good thing for producers.

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THE Director of the Mint issues a circular annually purporting to show the value and character of the gold and silver that is consumed in the arts. We have before us a circular sent out this year by him soliciting the desired information on which to base his tables, and in that he gives the following as the consumption of gold in the manufactures named in 1883: Watch cases, \$3,598,308; watch chains, \$827,000; jewelry and watchmakers' supplies, \$79,227; jewelry and watches, \$7,905,163, or a total of about \$10,500,000. Of silver the consumption is given as follows: Watch cases, \$5,443,907; watch chains, \$850,544; jewelry and watchmakers' supplies, \$87,558; jewelry and watches, \$9,003,383, or a total of \$15,385,392. This shows an aggregate of nearly \$26,000,000 of the precious metals consumed in one year by the jewelry trade. The statistics are by no means complete, for the data is obtained from the voluntary statements of the manufacturers, and many of these were not consulted, the number being so large that not even the Treasury Department could find them all, and hence a liberal addition should be made to the aggregate

to represent those who are unreported. It would be safe to place the grand total at \$30,000,000. But this does not represent the actual value of the goods manufactured, for no account is made of the precious stones used in the manufacture of jewelry, in the settings of which the gold or silver used forms an insignificant portion of the value. In giving the kind of gold used, the circular says that over \$4,000,000 of coined gold and about \$200,000 of coined silver was used, some old jewelry and the remainder being refined bars. Experts question this statement, affirming that very little coined metal enters into the consumption, from the fact that coin is alloyed more or less, and all manufacturers prefer to alloy their own metal. However, we presume the Director of the Mint does the best he can with the statistics furnished him by the manufacturers, and the information he gives is interesting if not especially valuable.

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THERE are always two sides to a labor strike, and those that occurred this spring sometimes had three sides. For instance, in one place noted for its many manufacturing jewelry establishments, the workmen had organized their trade union and felt strong enough to dictate terms to their employers. They decided that as soon as the busy season commenced they would demand an advance of wages, and, if this was refused, they would strike in a body. But, fortunately for both them and their employers, the strikes and boycotts in other lines of industry were made before the jewelers were ready, and so widespread was the demoralization that business was knocked on the head, and the jewelers concluded that they had better not strike, but be satisfied if they got through the season without a reduction of wages. It is not often that strikes bring good to any one, but in this instance the jewelers were saved a contest that could not but have proved costly if not disastrous. It is probable that the workmen who had this strike in contemplation learned considerable from the experience of others during the many strikes that occurred, and that they will hesitate some time before precipitating a conflict with their employers. It would seem that in a trade requiring so much and such a high order of skilled labor as does the jewelry trade, the workmen could afford to stand upon their individual merits and not depend upon any labor organization to fix their wages. All arbitrary scales of wages give an advantage to the poorer workmen at the expense of the more skillful ones, making mediocrity the standard by which all labor is measured. One manufacturer, who was kept informed of all that transpired in regard to the proposed strike, found that two or three of his own employees were among the most violent of the agitators, adding personal ingratitude to their offence, for he had been especially considerate of them in the matter of steady work and pecuniary advances in times of their need. He said nothing, but the time soon came when their services could be spared and they were quietly dropped from the pay roll. The example was not lost upon the others, for in a very short time the employer was notified that all his hands had withdrawn from the organization. Many were glad of the failure of the proposed strike, and of the opportunity to cut loose from the society they had been compelled to join. They were not coerced in any way by their employer, but simply saw that the course proposed by the reckless agitators among their number was opposed to their interests as individuals, and were delighted when the opportunity came for them to re-assert their manhood and regain their liberty.

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WHILE the daily papers teem with accounts of robberies, some of them executed in the most ingenious manner, it is noticeable that jewelry establishments are victimized more frequently than any others. This is but natural, for the average thief usually looks over the ground carefully before making his depredations, and picks out

those places that promise the greatest rewards for his labor. There is nothing particularly tempting in a hardware or a grocery store, but everything the jeweler carries in stock has a special fascination for the criminal classes. It is not surprising, therefore, that we are called upon to record in each issue a long array of depredations perpetrated upon the jewelry trade. These frequent robberies should lead all dealers to exercise more than ordinary precaution for the safe keeping of their goods. It is a duty they owe their creditors as well as themselves, and is not fulfilled by simply locking outside doors. Valuable goods should be kept in modern fire and burglar proof safes, and every reasonable means adopted to make the premises secure. But in spite of all precautions robberies will occur, and to provide against loss by these, every dealer should have the additional protection that is afforded by membership in the Jewelers' Security Alliance. While this organization cannot prevent robberies, it steps in after one has occurred in the premises of one of its members and undertakes to find the thieves, recover the stolen property if possible, but to use every endeavor to secure the punishment of the thieves. To this end the Alliance employs the best detectives to be found, and they never give up the pursuit. So successful have they been in securing convictions, the criminal classes stand in wholesome awe of the Alliance, and a certificate issued by that organization, conspicuously displayed in the store of a member, is almost as good protection as the more substantial bolts and bars employed. It costs but a small sum to obtain this protection, and every dealer in the land should have it.

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WE AGAIN appeal to our readers to look over their list of insurance companies on their risks and see that none of them are of the "wild-cat" variety. During the last month one of the most aggressive of the unauthorized companies doing business in this State closed its doors, making a sensational and disastrous failure. This was the Anglo-American, of Washington. There are many others equally rotten doing business in this State without complying with the laws in any respect, some of which could not pay a thousand dollar loss to save them. They get business through unscrupulous brokers, who only care for the large commissions they pay, sometimes as much as fifty per cent. of the premium. When there are so many good, solvent, law-abiding companies seeking business, it is wholly unnecessary for any property owner to take any chances regarding the payment of the indemnity he contracts for in case he is so unfortunate as to meet with a loss by fire. But the insurance business has been so unprofitable to the companies of late that they have just effected a combination among themselves to improve their condition. All the companies doing business in New York, 155 in number, have recently signed an agreement binding themselves to allow only ten per cent. commission to brokers, prohibiting them from dividing any portion of this with their customers in the way of giving rebates, and also agreeing that all risks in the city and vicinity shall be rated by the Tariff Association, and no company be permitted to write the risk below the established rate. This does away with cut-throat competition, for one company can write no lower than another, but it will have a tendency to improve the character of the indemnity enjoyed by property owners. It is better for all that the companies should do a profitable business, so that when they are called upon to pay losses there will be no question of their ability to do so, or any necessity for their resorting to tricks to reduce the amount of their liability, as has too frequently been the case. Rates are not likely to be advanced materially, but the lopping off of the heavy and exorbitant commissions heretofore paid to brokers will enable the companies to do business at a profit at present rates. Property owners should rejoice at this action, for a large part of the money they have paid in premiums has gone into the pockets of the brokers, that industrious, useful but greatly overpaid class of the community.

Every insurer who can do so should do business directly with the companies and thus get the advantage of the commission paid to brokers. Still, as the insurance business is one full of technicalities, perhaps ten per cent. is not too much to pay to the man who places his knowledge of them at your service.

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THE recent tragic death of crazy King Ludwig, of Bavaria, excited the sympathy of all mankind. His many eccentricities during his reign had excited widespread comment and wonder; there seemed to be no extravagance or selfish indulgence of which he was not capable, and his subjects were roundly taxed to pay the cost. His suicide by drowning on the eve of his deposition and confinement in an asylum, however, seemed to condone his offences, and his subjects mourned his loss most sincerely, even to a point that threatened a serious political outbreak. Administrators are now at work hunting up his estate, and it is reported that in one of his castles several coffers have been found filled with diamonds, rubies, pearls and other precious gems. As he was famous for the number and elegance of his castles, it is thought that stores of gems will be found in others yet to be searched. King Ludwig was known as a liberal purchaser of precious stones, but it was supposed that he had given them away to his favorites, male and female; the present indications, however, are that he hoarded them simply for the purpose of hoarding, for he had little enjoyment of them. Possibly he anticipated trouble, and, like some other deposed monarchs, appreciated the fact that a very large fortune could be conveniently stored up in gems, and that they would be available to him in any part of the world in case he should be banished from his own dominion. But his store of gems could neither preserve his reason nor his life.

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THE Civil Service bill, as it passed Congress, contains a provision for the re-issuing of the \$1 and \$2 greenbacks, and also a clause authorizing the issue of \$1, \$2 and \$5 silver certificates. All business men will rejoice to know that we are to get back the smaller denominations of greenbacks. There have been more silver dollars floating about of late than was pleasant, while all the banks have displayed at the windows of the paying-tellers the disheartening legend: "No small bills." Business men having pay rolls to make up on Saturday have found this a very serious embarrassment. It is to be hoped that the re-issue of greenbacks will be sufficient to satisfy the ordinary demands of trade for bills of smaller denominations.

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THE Retail' Dealers Protective Association of this city is displaying considerable activity, and prosecuting enquiries relative to those jobbers who have the reputation of selling goods by retail at wholesale prices. This is the practice they have set their voices against and propose to put an end to it if possible. Their objection is not so much to the wholesalers selling at retail as it is to the prices they charge for the goods so disposed of. They have found out by actual demonstration that a stranger can go into some wholesale houses and buy a single article and get nearly all the discount that would be accorded to a regular dealer. They naturally claim that this works a great injustice to them, and they insist that if the wholesalers must or will sell at retail that they shall charge retail prices. This much protection at the hands of the jobbers they are certainly entitled to, and we have no doubt it will be cheerfully accorded by most of the houses in the trade. The Protective Association repudiates any idea of a design to "boycott" any manufacturer or jobber

whatever may be his practices, but they claim that as a matter of self-protection, they will simply refuse to buy goods from those who sell at retail. They do not propose to do anything beyond this, and will not seek to injure anybody's business who opposes them, or indulge in any acts of intimidation that have characterized so many of the late strikes. Their purpose is simply to protect their business and not to interfere with that of any others. It is a well known fact that some jobbers, especially dealers of diamonds and other precious stones, carry certain goods intended for the retail trade. These are valuable gems that retail dealers would not be expected to carry in stock, nor would purchasers look for them elsewhere than in stocks of importers. Of course, dealers in diamonds carry such goods as the retail trade desires for the exclusive use of that trade, yet they also have more valuable specimens for sale to customers not in the trade. But, as a rule, wholesale dealers are not expected to do a retail business, and while most of them claim they do not, it is well known that few of them, comparatively speaking, will refuse an order from any customer who goes to them. They may not seek the retail trade, but it has become so customary for jobbers to sell at retail that many persons desiring to make purchases pass by the retail houses and go direct to the jobbers. This is especially the case in New York, Chicago, Philadelphia, Boston and the large cities generally. What the retail dealers demand is a well defined distinction between wholesale and retail trade, and this they propose to have made if possible. The Protective Association, as stated in our July issue, started off with a membership of something over 100 retail dealers, and since that first meeting many others have signified their desire to co-operate with and become members at the earliest opportunity. It bids fair to be a very strong organization and one to exercise considerable influence upon the trade. If it confines its practices to efforts for self-protection as indicated, the trade in general and THE CIRCULAR in particular will wish it well; but in these days when "combinations" and "conspiracies" are very prominent and have been used against the public welfare, all trade organizations need to be extremely cautious in their adoption of means to secure reforms of the many evils from which they suffer. It is a short step for a reformer to become an oppressor, and the power to inflict evil, as has been so frequently demonstrated of late, is a great temptation to use it unjustifiably.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number Two.



HERE IS also another man who, at the last, needs passing notice, not because of his great achievement in the horological industry as we look at it to-day, but because of the results he accomplished with the limited resources at his command. This is Jacob D. Custer, who spent his early life in Worcester, Montgomery Co., Pa., where his father had what, in the vernacular of the vicinity, was known as a "thunder grist mill"—in other words, a mill that could only be operated when a shower of rain sufficiently raised the water in the little stream on which it was built.

In 1831, when about twenty-two years of age, he left home and went to Norristown, where he commenced making high-case clocks. He had never served an apprenticeship at the clock making trade, but his restless mechanical genius led him in many directions, so that in the course of his career we find that he had tried his hand at almost everything, from a watch to a steam engine.

In reference to the watches Custer made, the writer has ascertained the facts from Dr. Jacobs, of Norristown, who was his intimate friend

and who still carries one of them. They were made between the years 1840 and 1845, and were about a dozen in number. These dates show him to have been the third maker of an American watch—Luther Goddard ranking first, and Henry F. Pitkin second.

Considering the limited facilities Custer had at his disposal, his watches are creditable specimens of workmanship. They have lever escapements, three-quarter plates and are about as large as a 14 size Waltham. The balance bridge is of steel and fits into a countersink in the plate, so that it is flush with the top of the upper plate. The cases, which he also made himself, are of gold.

In the clock line he again diverged somewhat from the beaten track. The Norristown Court House clock, which he made and which is still in use there, has a cast iron gear with a large tin fly-wheel. It has a recoil escapement, with a wheel six inches in diameter, and twenty-one teeth; and a two-seconds pendulum. He also built a clock for the old Merchants' Eating House on Market street, Philadelphia, which was cleverly contrived to strike at meal times only.

Custer's talents, as before stated, took an unusually large range, and we find him at one time engaged at the Norristown wharf, building a steamboat, and at another constructing an engine in the Stony Creek sawmill, where it is still in use. Occasionally, by way of variety, he would make himself a pair of shoes.

He soon acquired more than local reputation, and, in 1842, Professor Bache, of the U. S. Coast Survey, having heard of his skill, wrote him in reference to the construction of a clock to propel lights in the government lighthouses on the coast. Custer's first estimate of \$200 was rejected; later, however, he was instructed to make the clock, which, though rude in appearance, did its work so well, that he subsequently furnished the Government with several hundred of them.

Our mechanic was often consulted by those who wished to make, or have made for them, any peculiar or intricate mechanical device. When thus employed, it was his custom to charge one dollar and fifty cents a day for his services, and he was found to be especially conscientious in such matters. He made many clever things, but probably his most useful invention was the bullet machine, which he constructed during the early part of the civil war; but, as usual, others benefitted more thereby, financially, than he did.

Mr. Custer had no educational advantages during his youth, but by constant application he became in later years a well-informed man, and in the lawsuits that arose out of his varied business, was in the habit of pleading his own cases. He acquired quite a reputation as a lay preacher, but in the latter part of his life became an infidel and turned his back on the cause of Christianity, which he had so long and so nobly championed. On his death in 1879 passed away one who, by his energy and ability, was fitted for the front rank in any technical pursuit on which he might have chosen to fix his ingenious but erratic mind.

THE BOSTON WATCH COMPANY,

Including the American Horologe Company, Warren Manufacturing Company, and Messrs. Dennison, Howard and Davis.

In speaking of the manufacture of American watches by machinery, it is often said that Mr. A. L. Dennison is the father of the industry. Within certain limits this honor can be accorded to him, but credit is also due to others, and it is the writer's purpose, before going into the details of the history of the company, to define, if possible, the relations which each one bore to the enterprise as a whole. Certainly, so far as the idea of making watches by machinery in America on the interchangeable plan was concerned, Mr. Dennison was its father, but it must, however, be borne in mind that the idea of machine made watches could not be called his entirely, for, ten years previous to this, an unsuccessful attempt was made in Hartford, Conn., to make watches by machinery. While it brought about financial disaster to those interested, it resulted in the production of nearly, or quite, one thousand watches.

Mr. Dennison was also the paternal ancestor of many distinctive features in American watch manufacture, which, in substance, remain the same to-day as when he introduced them. It may be further said that they will always remain as monuments of his thought and handiwork.

The practical details of the business of the company, however, were in a large part left to Mr. Edward Howard, who was one of the proprietors. His indomitable will and mechanical skill were brought to bear on this point. The business management, which also rested on Mr. Howard's shoulders, was no small burden, as can be easily imagined by the following words of Mr. Dennison: "I do not think that there were seven times in the seven years that we were together that we had money enough to pay all of our employees at the time their wages were due. Very often we would find ourselves without any cash at all on hand, but Mr. Howard would manage in some way to produce enough to tide over with."

While speaking of Mr. Dennison, who was so prolific in ideas and so bold in schemes, and of Mr. Howard, who was both skillful and energetic, we must not forget to mention Mr. Samuel Curtis, the looking glass manufacturer, of Boston, who had faith in the venture to the extent of furnishing \$20,000 to carry on the business, although he never took an active part in it himself. He was, however, as all must agree, a very important factor. The other gentleman interested was Mr. D. P. Davis, a partner of Mr. Howard in the clock business, which was carried on independently of the watch factory. He never took any active part in the management of the latter. Before going further with the history of the enterprise we desire to give a short biographical sketch of both Mr. Dennison and Mr. Howard, who were the two prominent gentlemen in it.

AARON L. DENNISON

was born in Freeport, Maine, in 1812. His father removed to Topsham in 1818, and to Brunswick in 1824. Aaron, when quite young, displayed a mechanical turn of mind, being very handy with his pocket knife. At the age of eighteen he was apprenticed to Jas. Carey, the clockmaker of the town, with whom he remained three years, and then went to Boston, where he offered his services free gratis to Messrs. Currier & Trott. This proved a good thing for the young man, for he was with them a year and then took a window for himself near the corner of Washington and Milk streets, but soon gave this up to enter the employ of Jubel Howe, who was in charge of the repair department of Messrs. Jones, Low & Ball. From here he went to New York City and obtained a situation, and, by some effort on his part, he was able to gain from the Swiss and English workmen with whom he became acquainted a large amount of information about the various methods of doing fine work.

In 1839 he decided to return to Boston and establish himself as a dealer in watches, tools and materials, and do watch repairing for the trade. He located at 116 Washington street, and issued catalogues to the trade. He kept his material in a very orderly manner, and to aid in doing this and in selecting new pieces readily he got up his "Standard Gauge," which has since become "The U. S. Standard," especially for mainsprings. His experience during these years may be considered a stepping stone to what he, together with Mr. Howard, was able to accomplish a few years later. In 1845 Mr. Dennison engaged in a general jewelry business on the same street, but his mind was still intent on the plan of establishing watch making on the well-known system of interchangeability as practiced at the Springfield Armory and among the Connecticut clockmakers.

He visited the Armory and did a great deal of planning, often taking a walk late in the evening on the Commons for that purpose. He went so far as to make a pasteboard model of a factory, having in view that the different departments should be connected by moving bands passing along in front of the workman to transfer the work from one to the other. The writer is reminded in this connection of what a gentleman prominent as a watch manufacturer said of him recently: "There is scarcely anything that could be thought of in the line of watch manufacture but what had been in Mr. Dennison's

prolific brain at some time or other." He knew Mr. Howard, of Howard & Davis, and held several consultations with him in reference to his plans. Mr. Howard readily consented to join him if they could raise the necessary capital, but as he (Mr. Howard) had no surplus to spare from his clock and scale business, they had to bring in a capitalist in the person of Samuel Curtis, of whom we have just spoken. We will leave Mr. Dennison here as an individual, and, after having given a short sketch of Mr. Howard, pass on to the history of the company.

EDWARD HOWARD

was born in Hingham, Mass., on the 6th day of October, 1813. He lived there until the age of sixteen, and then went to Boston as an indentured apprentice to Aaron Willard, Jr., to learn the trade of clockmaker. The term of apprenticeship was five years, at the end of which time the young man entered the employ of Mr. Henry Plympton, who was the successor of Benjamin Dearborn, the inventor and maker of Dearborn's Patent Balance. He remained with Mr. Plympton six years, working on fine bank balances.

In 1842 he formed a partnership with David P. Davis and Luther Stephenson, the firm being Stephenson, Howard & Davis. They were located in Theatre Alley, where they made a general line of balances, together with some church and gallery clocks, regulators and Willard timepieces. At the end of two years the firm removed the business to Roxbury, where they built a factory and increased their facilities for making both clocks and scales.

A short time previous to this Congress had passed a law determining the amount of postage on letters by their weight, and the Postmaster-General had advertised for proposals for 40,000 letter balances. Each party desiring to bid was obliged to furnish samples of the kind of balance they thought would best answer the purpose. Mr. Howard designed and made five different kinds, and went in person with them to Washington, where he met about one hundred others on the same errand, all having samples. After a thorough test the contract was awarded to Mr. Howard, and was continued by him in connection with the clock business for twenty years or more.

Soon after obtaining the government contract for balances, Mr. Howard designed a standard of weights, measures and balances to conform to the new standard which had been delivered to the States by the general government. He embraced the whole in a cabinet and presented it to the Legislature of Massachusetts for inspection, which, proving satisfactory, resulted in an order to make one for every city, town and county in the State, 330 in number, at a total cost of \$50,000.

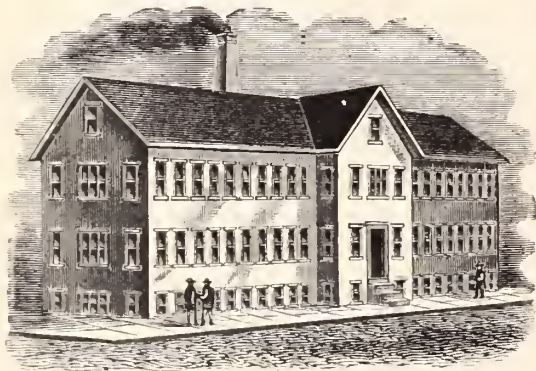
We cannot speak here of all the various manufacturing enterprises which Mr. Howard and the firm of Howard & Davis and their successors engaged in, as that will be found in connection with their history as clockmakers, but will hasten to call attention just now to Mr. Howard's connection with watch manufacturing, even at the risk of repeating some details that will be given elsewhere in these articles. There is, however, two or three schemes which might have brief mention just here. One was the manufacture of fire engines of the style familiarly known as "tubs," and still to be seen at the present day in some villages. Another was the manufacture of sewing machines in Worcester, Mass. The factory in that place was burned out, which occurrence resulted in the firm's attempt to make leather-splitting machines, but without much success.

Undoubtedly if he could have foreseen the many desperate struggles and the thorns that lay along the path, he would never have engaged in watch manufacturing, but being permitted to do so and having put his shoulder to the wheel he knew no such word as fail. To his indomitable perseverance and mechanical skill it must be said are largely due the success of the firm of which he was a member, and of the company which now bears his name. To him also may be credited several important improvements and inventions that are now considered indispensable in the manufacture of watches by machinery. The conversation to which allusion has just been made resulted in the partitioning off of a small room in one corner of How-

ard & Davis' clock factory in Roxbury late in the fall of 1849, where Mr. Dennison commenced to experiment and to build machinery after his own ideas, the factory not being built until the following summer. Mr. Howard in speaking of this afterward said: "Mr. Dennison was a very fine watchmaker, but as a machinist and builder of watch machinery he was certainly not a success."

In a letter to Mr. W. H. Keith, one of the former presidents of the Waltham Watch Company, written to him by Mr. Edward Howard, the writer finds the following with reference to what took place during those months. The first tool was for the purpose of forming the watch plate with all its cuts and cavities at one movement. The tool was in the form of an upright lathe. The next tool consisted of a set of dies and punches whereby all the holes could be punched out at one time. It was supposed that all the holes in all the plates, if they could be punched at all, would be alike and in the same place every time, but such did not prove to be the case.

They were of course anxious to have these tools a success in order to begin work at once and made only a few trials, pronounced the experiments a success, and laid the tools aside for future use. Mr. Dennison was assisted in this work by Mr. O. B. Marsh, then in the employ of Howard & Davis. In the summer of 1850 several tools were completed, a model watch made, and other matters attended to. A move was also made towards securing a location on which a factory was to be erected. A lot was purchased of Mr. Aaron D. Williams who owned much of the land in the vicinity. A building was erected on the corner of East and Prescott now Hampden st., nearly opposite the clock factory. The plot of ground on which the building was situated was 50 ft. by 125 ft. The building was 100 ft. long and 25 ft. wide in the wings and 40 ft. wide in the center. It was built of brick, two stories high; it was commenced in September, 1850, and completed in the latter part of December of the same year, when it was immediately occupied. The power was a small steam engine. It now forms a part of the E. Howard Watch and Clock Company's watch factory, having since been raised to three stories and large additions made at different times. We give a cut of the original building.



THE ORIGINAL BOSTON WATCH FACTORY.

The benches in the factory were of mahogany. The wings of the building were divided into small rooms, or stalls, by partitions about 8 ft. in height, each of these rooms having a swinging blind door opening into the main aisle down the center. The reason for this arrangement was that Mr. Dennison thought the European workmen, who had been accustomed to work in their own homes, would be better satisfied to have separate rooms and thus in a measure overcome the jealousy which would exist among them. This plan was, however, found impracticable, and after being in use for about a year the partitions were removed.

It was decided to conduct the business on the start under the name of the "American Horologe Co." The supposition to the reader would be that the firm was Messrs. Dennison, Howard & Davis, from the fact that so many of the watches were engraved with that trade mark. Such a firm however never existed, in reality it was a trade mark which they used. Messrs. Howard & Davis were partners in the clock business and Mr. Dennison was superintendent of

the watch factory on a salary and a prospective interest in the profits if there were any, but no papers were passed between them as a firm. Mr. Curtis was the capitalist but his name did not appear. The name of the "American Horologe Co." was continued but a few months, it being too suggestive, as they were obliged to send across the water for much of the material they used, and the dealers on the other side were not entirely free from jealousy at that time. The name of the Company was then changed to the Warren Manufacturing Company, after General Joseph Warren, who was born in Roxbury near the site of the factory in 1741, and who was killed at the battle of Bunker Hill in 1775. The first hundred watches which they made were engraved "Warren Company." We have spoken of Mr. O. B. Marsh as the first employee, he is now a prominent jeweler in Binghamton, N. Y. Next in order comes his brother, Mr. D. S. Marsh, now a clothier at Waltham. Mr. James L. Baker was the third man taken into their employ. He subsequently made the escapements and is now in the employ of the American Waltham Watch Company.

The reader who has followed the history of this enterprise thus far will, by this time, be anxious to know something of the watches they made, a model of which has already been alluded to. It was modeled, as has been stated, by Mr. Dennison. His idea was to produce a watch that was in some respects different from anything in



ORIGINAL EIGHT DAY WATCH.

the market, and, at the same time, have it in a general way resemble the ordinary style of English watch, as the public at that time knew no other watches than the Swiss and English, with a preference for the latter, especially for a fine watch. Mr. Dennison made his model to a large extent after the Perry English movement, which he considered about the proper size. He called it 18 size, and it corresponds approximately to the 18 size full plate American movement as at present made. The way in which he arrived at the size was as follows: He took as a unit of measurement one inch, which he called zero. He divided the second inch into thirtieths and numbered the movement according to the number of 30ths over one inch, thus making his 18 size movement $1\frac{8}{30}$ inches in diameter. He designed it to run eight days, as he thought an eight day watch would be in popular demand, but it proved a failure from the start from a mechanical standpoint; and no doubt it would have proved a failure from a commercial point of view. The barrel was not large enough to take a spring that would run it through the whole period of seven days on correct time, as it would lose three or four hours towards the latter part of the week. This was about the state of affairs when Mr. N. P. Stratton came on to the field in the early part of 1852. He was one of the original apprentices with H. & J. F. Pitkin at their Hartford watch factory some ten or twelve years previous to this. He at once told Mr. Dennison that it would be best to make this into a one day watch, and suggested a plan for utilizing the material already made. The cut represents one of the eight day movements as first modeled.

The changes were to cut the barrel bridge in the center, and put on a balance bridge with a shoulder of the usual form, and, of course, throw aside the extra set off wheel and pinion, which had been used to make it run eight days. The part of the barrel bridge punching to which the balance bridge had been secured was utilized by turn-

ing it over and using it for a barrel bridge in another movement. The third wheel, which previous to this had run under the center wheel, after the English style, was now raised to run over the center as they do in the usual form of full plate American movement of to-day. The train was an improvement on the English, as it was a 17,200 train, and was used for many years until the trade became educated up to the quick or 18,000 train now in universal use. This, we believe, is the true history of the modeling of the 18 size full plate movement which they made and which was afterwards made by the Boston and the American Watch Companies for many years, and is essentially the 18 size movement of to-day, although, of course, many improvements have been made since. It was made in only one grade at first and had plain steel balances with large aqua marine plate jewels and English cream colored dials. The first hundred movements, as previously stated, were engraved "Warren Company," and the remaining nine hundred, which they made during their stay in Roxbury, were engraved "Samuel Curtis." The escape wheel of this movement had ratchet teeth, but owing to the difficulty in handling without injury, they soon flattened the teeth on the end a little. After their removal to Waltham the club teeth escape wheel was adopted. The pallets were made with two angles on the back, after the English style. They were, of course, close pallets.

We have spoken of the failure of the first eight day watch as originally modeled, but Mr. Dennison did not give up the idea of an eight day watch at that time. He made the Marsh brothers a proposition that if they would make two eight day model watches, doing the work in overtime, he and Mr. Howard would furnish all the materials, tools, shop room, etc. to carry out the project, the movements to belong to them when completed. They concluded to accept this proposition, and immediately set about constructing the movements, which were 20 size, having two large barrels and an extra set off wheel and pinion of course. They did all the work themselves except the jewelers work, which was done by Mr. John Lynch, who had come there as jeweler a short time before. These watches, it may be said, were a success, and are carried still by these gentlemen. They are the first watches actually turned out from the factory, as they were completed before any of the regular watches were ready for market, although, of course, they are not to be considered so in the regular order of manufacture. The watches were completed in the early part of the fall of 1852, and Mr. Dennison had them at once commence work on a hundred. It may be said in this connection that only about twenty of them were ever finished, and none put on the market as a regular product of the factory. No. 1 of this lot is now the property of Mr. Edward Howard. It was stated that the trials of the first eight day watches were unsatisfactory. This would indicate that they were entirely finished, but such was not the fact. They were set and run in the gray, and were not gilded, although an unsuccessful effort was made to gild them. The fact was, Mr. Dennison found himself unable to etch and gild satisfactorily, although he had visited England during the time the factory was being erected to find the source from which supplies of raw material could be obtained, and also to learn the art of etching and gilding watch movements, and he supposed he had accomplished his purpose. His greatest difficulty, however, was in the matter of using the scratch brush, of which he had not fully learned the use. He was not aware that the work must be struck squarely by the end of the wires. The company then decided to send Mr. Stratton to Coventry, England, in the fall of 1852. He remained there several weeks, and by the use of a little money and a little strategy he was fully able to master the art, which was then held as a trade secret. He arrived home in November, 1852; no watches were, however, really turned out that year, but early in the spring of 1853 watches were ready to put on the market. The few eight day watches which were made after the Marsh Bros.' model were also completed about that time.

Before entering into other details of this history the writer wishes

to call attention to their struggles in the matter of a wheel cutting engine which they built. It was made on the plan of a planing machine, viz.: planing out the metal between the teeth, having a large stack of wheels on one mandrel. They found themselves unable to make two wheels exactly the same size, from the fact that the arm which held the cutter would spring, and the wheels would be larger at one end of the stack than at the other. This machine cost them something like \$500.00, but it was laid aside and an English wheel cutting engine was procured to take its place temporarily till a proper one could be made.

(To be Continued.)

Sight.

[BY DR. C. A. BUCKLIN, NEW YORK.]



RESBYOPIA is the name of the optical failing which causes ninety per cent. of those suffering from weak vision to consult an optician. The following table taken from Douder's, illustrates the usual decline in the ability of the eye to accommodate for near objects, when advancing age alone is the cause of it:

Table showing the failure of near vision from advancing age.

| Age. | Glasses Required. | | Distance of Distinct Vision. | Range of Distinct Vision. | |
|------|--------------------------------|--|------------------------------|---|------------------------------|
| | Present Distant Vision Normal. | Distant Vision was normal in y th | | Which Convergence will ALLOW THROUGH GLASSES. | |
| | | | | Far Point. 60 inches. | Distant Point. 12 inches. |
| 48 | Convex 60 | Convex 60 | 14 inches. | 40 " | 12 " |
| 50 | " 40 | " 40 | 14 inches. | 30 " | 12 " |
| 55 | " 30 | " 28 | 14 inches. | 22 " | 12 " |
| 58 | " 22 | " 20 | 13 inches. | 18 " | 12 " |
| 60 | " 18 | " 16 | 13 inches. | 14 " | 12 " |
| 62 | " 14 | " 12 | 12 inches. | 13 " | 11 " |
| 65 | " 13 | " 10 | 10 inches. | 9 " | 9 " |
| 70 | " 10 | " 7 $\frac{1}{2}$ | 9 inches. | 8 " | 8 " |
| 75 | " 9 | " 6 $\frac{1}{2}$ | 8 inches. | 7 " | 7 " |
| 78 | " 8 | " 5 $\frac{1}{2}$ | 7 inches. | | |
| 80 | " 7 | " 4 $\frac{1}{2}$ | | | |

It is plainly seen that the *first* column of the above table represents the age of the person, the *second* column represents the glasses which are usually required for fine, close work by persons of this age, who, have, at the time of examination, normal distant vision. The *third* column represents those who have had normal distant vision during youth, but require stronger glasses at a given age than others require, owing to acquired hyperopia (far-sight), to congenital hyperopia, or a diseased condition of the lens which destroys its elasticity. To illustrate how previously existing visual defects can influence the strength of the glasses required at a given age, let us take a person at the age of 55. Now if the eyes are perfectly normal, he will require lenses No. 30 convex. If he was born with an hyperopia of $\frac{1}{30}$ he would require a glass which corrects his hyperopia and a glass which corrects for the defect of his age, $\frac{1}{30}$ hyperopia and $\frac{1}{30}$ age = $\frac{2}{30}$ or convex 15, the number of the lens which would be required at the age of 55. On the other hand, had the individual been born with a myopia of $\frac{1}{30}$, his age requiring $+\frac{1}{30}$, while his myopia requires $-\frac{1}{30}$, consequently he would not at the age of 55 require any lenses to read with. The myopia being greater, he would be able to do without glasses for a correspondingly later period in life.

Myopic people reach a period in life when they must wear near-sighted glasses for the distance and convex glasses for reading.

There are two quite common causes for the reduction, namely, glaucoma and incipient cataract.

The former requires the strength of the lenses to be very rapidly increased; the pupil is usually dilated, and the person will notice, if the attention is directed at the flame of a candle, that it is surrounded by a ring in which the spectral colors are more or less distinct.

In incipient cataract the strength of the lens is out of all proportion to the age of the individual, and then never quite satisfactory.

There is also a condition called premature old age for the want of

a better name. This also greatly affects the range of accommodation. The skin shows a wrinkled, dried appearance, the hair is very white, and the entire individual has a general appearance of atrophy.

In the use of lenses which are necessary to correct refraction or assist accommodation, glasses seldom give any annoyance, but, where the acuteness of vision is reduced, and we give glasses to magnify objects to enable one to see them, the annoyance is great, and the results are seldom satisfactory.

I here introduce a system of rapidly testing vision which has mainly been constructed as the result of practical experience. It is the test which has been furnished by the Spencer Optical Mfg Company. It is purely practical and not based upon any particular scientific basis.

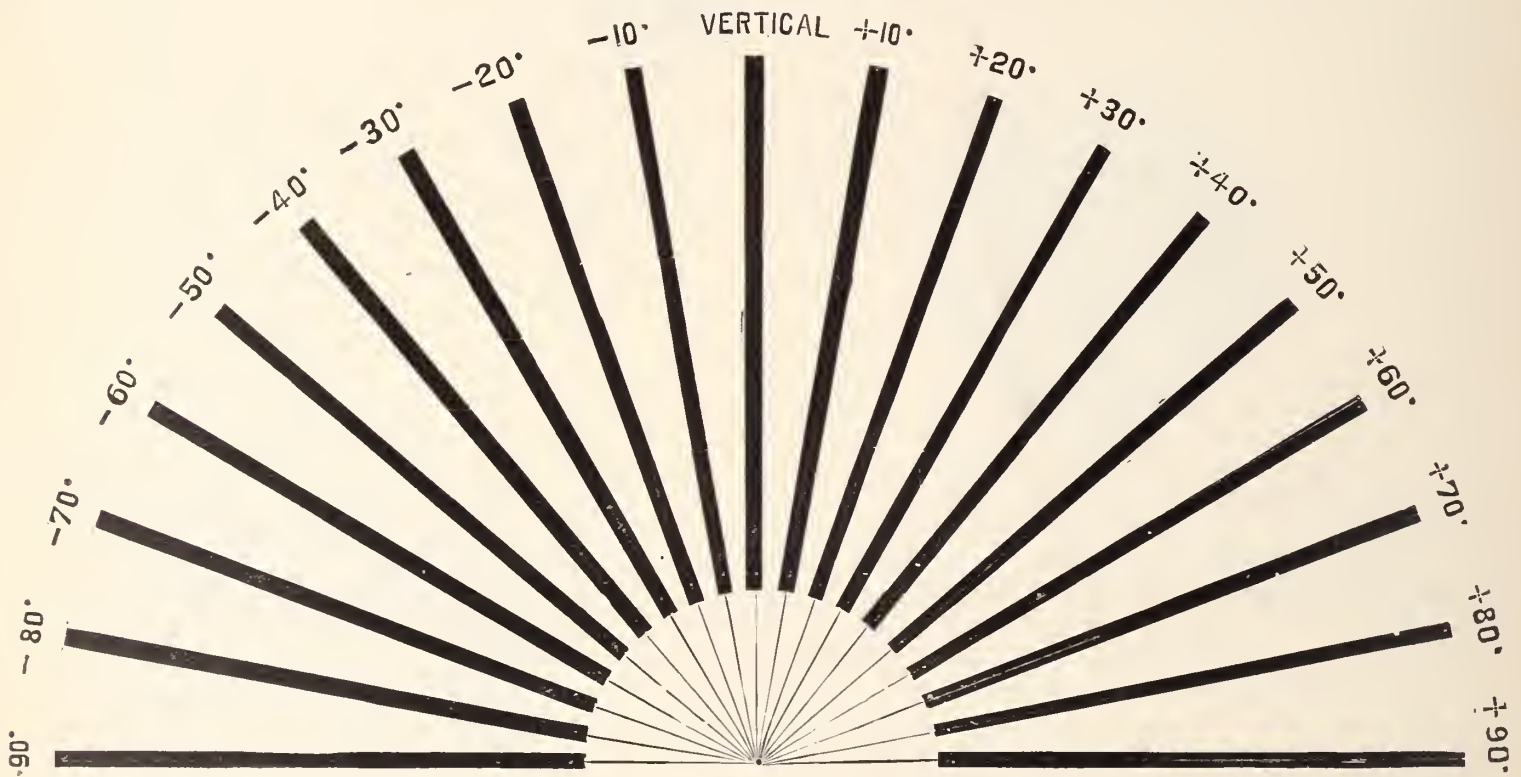
of the fan in the above test at the greatest distance they can be seen distinctly, and if they do not all appear equally dark, astigmatism exists. If they do all appear equally dark, myopia, excessive hyperopia or some diseased condition of the eye exists, providing distant vision is not normal.

If astigmatism does not exist and glasses are required for reading, the attention is directed to the graduated print at twelve inches; determine the finest print which can be read, and opposite will be found the number of the glasses required. This number will correct the presbyopia whether it be normal for the given age or excessive. It also corrects any hyperopia or makes allowance for any existing myopia, which never could be done by any system where the glasses are given with any respect to the exact age of the individual.

TEST FOR DISTANT VISION.



These letters should be read distinctly at twenty feet.



FOR FITTING PRESBYOPIA OR OLD SIGHT.

Hold this card about 12 or 15 inches from the eye, find the smallest type a person can read at that distance; the number corresponding will be the focal distance, or the number of spectacles required.

1st. It has long been the study of the most scientific minds in this country as well as in Europe, as to the best method of improving and preserving our eyesight. The experience of those whose power of vision requires help, advise the use of some artificial lens. 60 to 50.

2d. The first thing to be done is to obtain a soft cooling eye-glass or spectacle, constructed upon scientific principles which can relieve the over-taxed eye. 50 to 40.

3d. The Spencer Optical Manufacturing Company make the finest and most accurately measured spectacles in the world. 40 to 36.

4th. The Lenses in their better grades of goods are ground from perfectly white transparent material, thereby transmitting a perfect vision. 36 to 30.

5th. Experienced workmen only are employed in the production of their goods. 30 to 26.

6th. We make a specialty of Special Lenses. 26 to 20.

7th. Their Factories are at Mt. Kisco, N. Y.

8th. Salesroom at 15 Maiden Lane. 16 to 13.

9th. Spencer Optical 13 to 11.

10th. Manufacturing 11 to 9.

11th. Company, 9 to 7.

12th. New York, 6 to 5.

13. City. 5 to 4.

If one can promptly read the block letters in the above test, you have at once excluded near-sight and astigmatism. If he can not read the block letters at twenty feet with ease he is either near-sighted, astigmatic, or has diseased eyes. Place the radiating lines

When the eyes are normal, and vision makes the usual decline with advancing age, the table given above will indicate about the glasses required. All eyes are not normal, neither does the vision of all eyes decline uniformly with advancing age. The graduated print

therefore indicates the usual glasses required for reading when astigmatism does not exist independent of all accidental possibilities. The more I have experimented with this graduated print, the more fully have I been convinced of its practical utility.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

ALTHOUGH the spring season, owing to a combination of unexpected and adverse conditions not liable to occur again, was a disappointing one to many manufacturers, everybody appears to be preparing for a brisk fall trade. There are already many new things in stock, with promises of numerous additional novelties before the month of August is spent. No one any longer disputes THE CIRCULAR'S statement that jewelry is fashionable again. It has become a self evident fact, and shrewd manufacturers are on the alert to get out not only taking novelties, but attractive staple goods for the early fall trade.

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THE moonstone furore seems to be at its height. At least, there is a large stock of moonstone jewelry in the cases of both retail and wholesale houses. The moonstones are set now both in gold and silver, and in many cases value as well as effect is added by the association of rose diamonds. The moonstone faces continue popular, and are both fanciful and grotesque. Then there is a full line of neck and scarf pins in form of three and four clover leaf patterns. Often the stones set in these are tinted. Moonstones are of frequent occurrence in cuff buttons for both sexes, and are popular in studs for gentlemen's wear. These stones have also appeared on charms for Queen chains. There is a tendency now to employ the finest specimens of moonstone without either carving or tinting, but depending only upon the chatoyant reflection of the stone, and a unique setting for effect. Little balls set in claws show off the moonstone *en natural* to better effect than perhaps does any other form.

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THERE is good authority for stating that the opal—a magnificent gem too long neglected because of the foolish superstition of late years associated with it—is growing in favor abroad and is likely to come to the front here. As the opal is the only precious stone which defies imitation, and fine specimens are of rare occurrence, there appears no good reason why opals should not recover the high favor they held previous to the publication of Sir Walter Scott's novel, "Anne of Geierstein," in which romance is ascribed to this stone a supernatural power to bring bad luck. Previous to the appearance of this fiction the opal enjoyed its original character of being a love stone and suitable for a betrothal gage.

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THE opal is usually associated with diamonds, but other combinations are sometimes made. A new bracelet seen was a wire one with overlapping ends; a fine opal was set in one and a choice sapphire in the other. The result was a very pleasing one. A ring seen was set with a rare opal encircled with small diamonds. A cluster scarf pin of recent manufacture had an opal in the center set round with diamonds.

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THE garnet, while by no means a valuable stone, is always more

or less employed in jewelry on account of its brilliant color and hardness. There has been an effort of late to popularize this stone, and some very pretty effects have been gained in such ornaments as hair pins and necklaces; ornaments to be worn at night when the garnet is most effective. The garnet is being employed, too, in jewelry for misses and children, and affords a change from the turquoise, which is much used for the same purpose. During the past month have been seen some attractive round pins in light open work patterns and set with garnets. In illustration may be cited a circular brooch made up of innumerable windings in and out of gold rope and wire, thickly studded with small but brilliant hued garnets. There are also examples to be seen of moonstones set round with garnets. These last afford a showy ornament at small cost and meet the demands of a popular trade, but are hardly in as good taste as are the moonstones set round with rose diamonds, for two moderate priced stones when brought together are liable to cheapen each other.

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AS WITH all other stones, there are many varieties of garnet which are distinguishable by their color and also by the difference of their chemical composition. The varieties used in jewelry are known as carbuncle, cinnamon stone, almandine and Bohemian garnet. When cut *en cabochon* so as to assume a raised oblong shape, it is termed a carbuncle, and if of fair size and pure color, is, comparatively speaking, valuable. The variety known as cinnamon stone, as the name implies, is of a reddish-yellow tint, resembling somewhat the color of cinnamon. These stones come from Ceylon, principally, and are often sold as hyacinths or jacinths, from which, however, they differ in many important particulars. The almandine is frequently cut in facets and polished. Set with a back and foiled to imitate a ruby the almandine often passes for a ruby among the uninitiated. The Bohemian garnet is found in Bohemia, Saxony, and other parts of Germany; its color is a deep red, and it is one of the hardest of the garnet family. The superstitious and magical properties attributed to the garnet in ancient times were similar to those ascribed to the ruby.

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A DECIDED novelty, as yet in a crude state at the factory, but which will be in stock by the time this number of THE CIRCULAR is distributed throughout the trade, is what, for lack of a better name, will be now called the "fly pin." In reality this is not a pin, but an ornament to take the place of brooches and other pins, especially in delicate laces and thin fabrics. It embraces in its designs a large number of winged insects, and represents a sufficient number of sizes to furnish ornaments for many purposes. In a word, it appears as a blue bottle fly on a bonnet ribbon, as a humming bird for a brooch, a gorgeous butterfly for a hair pin or a dragon fly for a bouquet holder, and so on through the family of winged insects. Some of these pins are of plain gold, others are set with gems, while others are enameled in faithful copy of nature's hues. The novelty consists in the manner in which these pretty little ornaments are fastened on to the ribbon, the dress or in the hair. In the body of each fly is concealed an ingenious contrivance whereby the wings are movable. On being pressed together backwards, two little gold prongs underneath the wings open, and, being laid against the lace or fabric, gains a firm clasp on the same, when the pressure is removed and the wings are permitted to spread themselves. The advantages, especially for delicate fabrics, are obvious; the frailest web of lace cannot be torn, and, as the ornaments are of light weight, there is no pulling or sogging when fastened to thin materials. It is believed that fly pins will prove especially attractive on ball and evening costumes, for hair

ornaments, and fastening up lace draperies and holding on corsage bouquets.



THE new things thus far seen for the fall trade show the growing tendency to florid styles of decoration. Our foremost workers in fine enamel say that the demand is for rich warm coloring and more elaborate designs. The day of severely plain styles is past, and yet this tendency to effective and brilliant decoration, it is a pleasure to tell, does not in the least approach to loud or commonplace ornaments. It is more the gorgeousness of the butterfly or one of nature's own blossoms, where effectiveness and brilliancy are gained without loss of harmony.



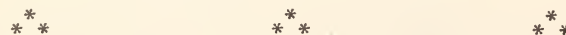
LIGHT lacey effects are seen in much of the gold jewelry; indeed, a number of beautiful specimens of gold filigree work have appeared, and one could not wish patrons a more beautiful style than the dainty delicate intricacies of filigree. Both all gold and gem set brooches have been made in filigree work. An exquisite pin for summer wear seen, was in form of a fern leaf with the edges a trifle curled, and a cool dew drop or two resting on it in form of diamonds.



VERY graceful open effects are gained in brooches formed of circles of gold in rope pattern, tied here and there in little knots that furnish a convenient setting for small gems. An attractive new brooch formed of gold rope and wire interchained, has in the center a carved moonstone face encircled with rose diamonds.



ONE of the most beautiful brooches seen this month simulates a single pansy of deep violet hues with a diamond in the center, and a border of rose diamonds on the outer edge of the flower. A pen and ink sketch of this pin can give no adequate idea of its beauty, as this is dependent on the perfection of the enamel work and the exquisitely delicate setting of the stones.



IN BOTH brooches and ribbon pins the designs oftenest used are of flowers or winged insects. These afford, in their brilliant colorings a fine opportunity for the employment of colored gems and enamel. A growing fancy is that of a butterfly with gems for the body and wings of translucent enamel.



A NOTABLE example of fine enamel work seen recently, was on a neck pin representing a violin with diamonds for pegs.



A UNIQUE brooch consists of three gold rings interlinked; in the center of one is a ruby, in another an emerald and in the third a sapphire; then set around one-half of each circle are rose diamonds, the other half being set with small stones that match in kind and color the ones in the center of the circles.



FINGER rings are again worn in large numbers by ladies. Many

of the newer gem rings are set in clusters. The approved mode is a fine colored gem in the center surrounded by smaller diamonds. Another favorite arrangement is that of setting several medium sized diamonds around the finger and filling in the interstices either with tiny diamonds of equal brilliancy or with small colored stones. The effect is a band of gems with no gold showing. Another favorite ring is a gold wire, one with overlapping ends set with stones. Three diamonds of uniform size, but differing in color, are set with good effect in the same ring.



THE Marquise ring is in favor. New examples seen recently were made with slender shanks and in medium sizes. One ring had an opal for the central stone, the remainder of the setting being filled in with rose diamonds. Very pretty effects are gained in Marquise rings set with small gems of uniform size and color, as small diamonds or rubies. There is, perhaps, no more effective way of utilizing small gems than this. Occasionally the gems are made to go partly around the shank so that no gold shows, and the ring appears to be made entirely of gems.



A NEW ring is that in which the ends of the shank pass without closing. These ends turn in opposite ways and are set with different stones. One seen contained a sapphire and a diamond. Not only is the result pleasing, but, as the ring is not closed, it will fit any finger without being cut or soldered.



ANOTHER charming fancy in rings is the one that employs three very light, slender and separate gold shanks set with single stones. These are worn on one finger, so that the stones slip past each other and appear like a single ring set with three gems.



THE FANCY for fine gems set in a silver or platinum ring, especially among gentlemen who possess a great yearning after English styles, continues to a limited extent. A usual arrangement is that of a hoop with one or three gems imbedded in it. Occasionally one sees a gem set high in these rings. The puzzle ring in platinum and gold, described in a previous number, continues fashionable, while the ram's head leads the styles just now in rings for gentlemen.



WHILE it cannot be said that there is a boom in ear rings, these ornaments are nevertheless in increased demand. In Paris, the hoop ring, both in gold of fine workmanship and set with gems, is again in favor, from which it is natural to argue that hoops will soon be popular here. In any event, some very beautiful ones are in process of manufacture for the fall trade by one of our leading manufacturers, and as hoop ear rings are becoming to most faces, we prophesy their success. The large ball rings, now worn in Paris, will also be ready here for the fall trade. Samples seen were decidedly stylish and attractive in effect. In gem ear rings the solitaire rings continue to take the lead, being at once the most effective and costly. But there are also ear rings where the gems are set in clusters, after the fashion of the finger rings described elsewhere. The finest pair of rubies seen in a long time were set in ear rings

and surrounded by small diamonds, although the rubies were quite large enough to have been worn as solitaires.

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THE demand for gem necklaces continues, and there is reason for believing that gold necklaces of delicate construction will soon follow. In silver jewelry, beads, collarettes and other neck ornaments are in fair demand. The pendant continues in favor, and this requires, when one is not the possessor of a gem necklace, a chain of some sort with which to wear it.

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THE desire for combination pieces in gem jewelry is still observable. Where ladies possess only a few fine gems these are made oftentimes to do double and even treble duty, being so set as to be transferable from a bracelet to a chain for a pendant, or for a brooch, or as an ornament for the hair. A clever and at the same time beautiful device in this direction is that which utilizes the same gems in a necklace, a pair of bonnet pins and a lace pin. To begin with, there is a necklace composed of two strands of fox-tail chain, held together by gem slides placed at short intervals apart, a turquoise and a diamond alternating. These gem slides are readily slipped off the neck chain and transferred to ear rings, bonnet pins and a knife edge bar pin. Then there is a combination pendant and brooch of turquoise and diamonds belonging to this set, at the back of which appears a locket.

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NEW YORK ladies are, many of them, patronizing what is known to jewelers as the demi-hunter watch, a watch with the face partly exposed. The fancy runs to watches with decorative hands and faces; in fact the demand is more and more for watches in fancy cases, and those copying old time styles are much in vogue.

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THE Queen chain continues to be the popular sort, but there are some very attractive fancy vest chains made and worn after the fashion of those described last month. Charms on watch chains are having quite a little run, and the preference appears to be just now for one handsome pendant, instead of several of less value. A unique charm is made both in gold and silver, to simulate a Chinese nut, and often this charm is hollow inside and finished so it can be used as a vinaigrette. Then there are Queens that terminate with a Spanish chestnut or an acorn.

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SO LONG as linen cuffs are worn, sleeve buttons will be a necessity. There appears little, however, that is new to note in this direction. The buttons for ladies' wear run in small and medium sizes and, as a rule, are characterized by daintiness of pattern and simplicity of finish. Very good selling buttons are medium sized round ones, in plain satin finish with a deep open star cut in center. This style provides an admirable setting for a single stone. Equally attractive are the round fluted buttons of bright finish, with the deep cut star and diamond in the center. There are also buttons of platinum and gold in pleasing patterns for both sexes. Moonstone cuff buttons and studs are popular.

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SOME very pretty studs for ladies to wear with summer dresses

have been introduced, such as small rubies, turquoise or moonstone set round with tiny diamonds. Then there is a full line of enameled studs showing small polka dots that are novel and attractive in appearance.

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THE present style of dressing the hair favors all kinds of ornamental hair pins, and consequently there are many attractive ornaments of this nature to be seen in the shops. The double crook, chased and studded with little gems, is a favorite pattern in hair pins. The hair pins surmounted by large chased balls of gold and platinum are another pleasing style.

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THE silver belts previously described are worn with summer dresses, and come now with linings of kid to prevent their wearing and rubbing the dress fabric. The line of fine silver jewelry is a large and varied one, comprising numberless new designs that must be seen to be appreciated. There is the usual stock of summer fancies in this jewelry which borrow their designs from lawn tennis, cricket, and other out-door sports; and then there is a line appealing to patrons of water sports, in way of yachts, fishing and rowing boats and the like.

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THE jewelry made for little people is deserving of mention. The patterns are exceedingly delicate and small gems are used with exceeding good taste. The turquoise, from its peculiar blue color, is especially appropriate for children's wear, and when set, as it is now, in unobtrusive and delicate gold mountings, commends itself.

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IN SILVER table ware there appear but few changes. Forms are, for the most part, very low, and old English designs are largely copied. *Repoussé*, both in white and oxidized finish, remains fashionable, as does the bright finish with fluted borders. After-dinner coffee services are an exception to the usual low forms; these continue to be made in tall, slender patterns, after Turkish models. Some new claret jugs noticed were of crystal cut glass with silver trimmings. These afford a pretty change and are quite effective when the figures are thrown out by a back ground of rich hued claret.

ELSIE BEE.

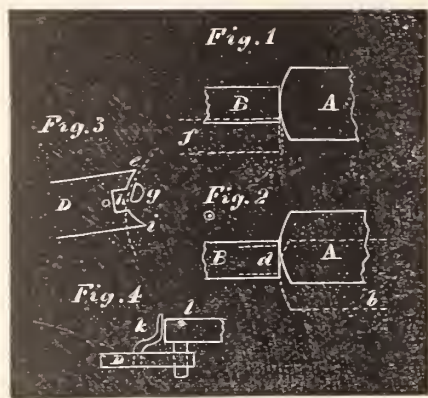
Problems in the Detached Lever Escapement.

BY DETENT.



TOO MUCH care and discrimination in the fitting of the jewels and pivots to the balance, and also to the pivots and jewels to the pallet staff and scape wheel—in fact, the entire escapement must be in condition to give constant efforts in all positions. And certainly this can not be accomplished if the pivots have too much side shake or pinch in certain positions. One fault is quite common to pallet action where a convex surface is given to the face of the pallet stones, as, for instance, in fig. 1, where *A* represents a pallet stone and *B* the scape wheel tooth. In such escapements the theory is the thickness of the tooth is supposed to exceed the end shake; consequently the action from the rounded surface of the pallet stone is

extended across the flat face of the tooth. This will be understood by inspection of fig. 2, where the pallet and scape wheel tooth is repeated. The dotted lines at *d* is supposed to represent the traverse of the convex surface of the pallet stone across the flat impulse plane of the tooth. Making the surface of the pallet convex is not so much to obviate or abate the friction, as to do away with the necessity of using oil on the pallets of club tooth escapements. A ratchet tooth scape wheel of brass or gold on well polished pallet stones made even of garnet need no oil, but a club tooth scape wheel of steel will soon show red dust in the scape wheel sink if no oil is used. And to digress a moment and take up a question which has been troubling some parties lately in regard to oiling the lever fork,



a great many workmen holding it unnecessary to do so. Now, this is no new conundrum to the makers of the detached lever in Europe. Badtolet, I think, is the only maker who claimed to have a fork which would run without oil, and this had a gold fork to a steel lever; and even this arrangement, in most cases, was found to work better after a few years if judiciously oiled. The trouble is (and for this reason most workmen do not discriminate) the fork which he puts up as he supposes dry, has previous to his cleaning been oiled, and it is next to impossible to remove a slight film of oil adhering to the fork, very thin and slight, still enough to prevent cutting. Few watch repairers of many years experience, but have found instances of dry forks cutting, and the space under the roller covered with red dust (oxide of iron) from the action of the fork, and this in the very finest watches, for the simple reason, in a rough half polished fork it would be next to impossible to remove all traces of oil from a fork of this kind which has once been oiled; even a soaking in benzine would fail to remove all the oily particles. If a fork is oiled and cleaned by pushing into pith, enough oil will remain to prevent cutting for months. In the rounded or convex pallet stone shown in figs. 1 and 2, it is very questionable if, after a few years' wear, oil is not necessary. Theoretically, a convex surface only touches a plane or flat surface on a line, but in practice this line soon widens as the convex surface flattens, and then the advocates of this idea will have to admit oiling to be necessary. The writer has had many thousand watches pass through his hands, and he has had repeated instances of watches which would not have any motion (with brass club tooth scape wheels) when touch of oil to the pallets, and the balance would almost seem to fly in contrast to the motion previous. I am no advocate of excessive oiling, on the principle of if a watch won't go grease it, and if it don't go then put in a stronger mainspring. No; I am as anxious as any man to avoid the effect of thickening oil; but as long as oil will abate friction, so long will the parts of a watch subject to the effects of moving surfaces in contact need lubricating as much as any machinery; and about as well as we can do under the conditions imposed is to look out for the best oil and use it judiciously. To resume our problem. It is well to try the fork and scape wheel, pushing one up and the other down to extreme end shakes, and see if the action on the tooth exceeds the dotted lines at *d*, fig. 2, as they should never pass into the relation shown at the dotted lines *f*, fig. 1. Here the fault is shown as getting too low on the pallet, but we should look out for its getting too high as well. Another fault in watches without end stones to the entire escapement

action, scape wheel pinion and pallet staff, as well as to the balance, is shoulder friction. The shoulder should only be wide enough to secure safety from the shoulder cutting the plate or bridge. If we find one shoulder (say to a pallet staff) much wider than the one opposite put it into the lathe and turn it down. Another thing to be looked to in regard to end shakes and the influence they may exert on a watch, is the condition of the jewel pin and also the guard pin. We frequently see the jewel pin sit obliquely; sometimes this is done to remedy a fault in depth between the fork and roller. Most American watches have adjustment for this in the fork; but in no case should the fault be corrected by setting the pin oblique; set your jewel pin parallel to the pallet staff, and ascertain if the fork is too short, the roller too small or the fault only in depth. To determine this bank up your fork so the pallet action is all right, *i. e.*, so when a tooth drops from one pallet the next tooth in action just securely locks on the other pallet. If both pallets does this to your satisfaction examine your fork action. At fig. 3 is shown at *D* a fork, and at *g* a jewel pin. If, now, the jewel pin is found to pass the angles *e* *i* of the lever at equal distances, the indications are the depth only is at fault, and if the fork is constructed so as to admit of moving forward, all we need do is to so advance the lever until the jewel pin *g* will just pass the angles *e* and *i*. If, on the other hand, the fork is not adjustable, the quickest way is to stretch the fork. Some readers will say this is botch work; no, it is not; for certainly, if the watch is a fine one, this change would not be necessary. Such changes almost invariably occur in poor, cheap imitation American watches; but most watch repairers do not feel rich enough to throw even undesirable jobs over their shoulder. If the lever has a guard pin take it out and stretch the fork until long enough. It may be necessary to put in a guard pin shaped as shown at *k*, fig. 4, but the part which comes opposite the roller should be parallel to the pallet staff, so as to ensure the same action in end shake trials. The conditions supposed could be effected by a larger roller, but, as a rule, the course suggested is the quickest, and in four cases out of five the fork would have been tampered with and need correction. In our next problem we will consider imperfect roller actions more at length.

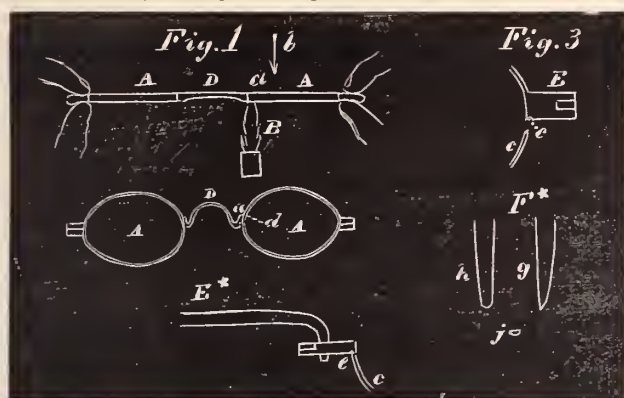
Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



MOST OF the hard soldering of steel specs can be done, by holding the parts in the two hands, by means of the blowpipe described in recent articles. The usual breaks in steel spec frames are the nose piece where it joins one of the bows or at the temple joint. The great point in soldering steel frames is to do the work quickly, being careful to heat as rapidly as we can, because continued heat not only softens but oxidizes the fine steel frames. About the best position for the jet from the mechanical blowpipe is directly in front of the workman, letting the jet act away from the operator. The position is shown at fig. 1, where *B* represents the blowpipe flame and *A* *A* the spec frames, and *a* the place to be soldered. In this figure it is supposed we are looking down. In fig. 2 the cut is as if seen in the direction of the arrow *b*, fig. 1. In the present case we are supposed to be about to solder the nose piece *D* to one of the bows *A*. A very little technical skill, together with a few hints as guides, and such jobs are quickly done. To resume our job in hand. The parts to be united should be scraped bright and clean so the gold solder (recommended before) will flow freely. Let us consider the parts to be united a little. The outer surface of the bow is usually convex and the end of the nose piece grooved to fit. This condition will favor us in the soldering, as we can apply the nose piece as shown in fig. 2, and by gentle pressure, when held as shown at fig. 1, keep the parts together. In preparing the work for heating after scraping as

directed above, rub up some borax on your slate, and apply a little with a fine pencil brush to both the bow and the end of the nose piece. We next take up a minute piece of gold solder and apply it to the outside of the bow between the dotted lines at *d*. We next put the nose to the bow and move it upward, carrying the solder with it. The idea is, we apply the little pellet of solder too low and push it up with the nose piece, until at the exact place and position to melt and flow into the joint. In holding the frames for soldering the parts are grasped as shown in fig. 1, but for heating we join the parts just below the blowpipe jet—about as indicated at the dotted outline in fig. 2, and when the parts and little pellet of solder are in the proper position we gently and steadily raise the parts to the position shown in fig. 2, which is supposed to be the one in which the blowpipe flame will act to the best advantage. After the gold solder has flowed we sink or drop the frame back to the position shown at the dotted outline; this is done with a quick yet steady motion so as not to disturb the relative position of the parts, and break the solder apart at the time of cooling. A little practice will enable one to solder such a joint in one-fourth the time it takes to read about it. For such work it requires a good bit of judgment all through; enough borax must be used to perfectly preserve the work from oxidizing, yet we do not want to use enough to (as the job heats and borax commences to bubble and boil) throw the little pellet of solder out of place. A substance called sandiver will, in a great degree, prevent the solder from rising. It is ground up with the borax, and an admixture of $\frac{1}{8}$ or $\frac{1}{10}$ is ample. The bows broken from the



joint is even a commoner break than the one just discussed, and, worse than all, is more difficult to manage. The concave wire which forms the bows being usually let into the joint, and, when a break occurs, it is universally in the bow wire close to the joint. Now, if we file out the joint so as to set in the concave bow wire as was originally done, we reduce the size of the frame and our glass is too large, or, the truth told, our frame is too small. Well, let us consider the situation and devise a means for doing our job as quickly as we accomplished our nose job. At fig. 3 is shown a joint, and at *c* the broken bow. We first file a slight notch in the joint where the dotted line *e* indicates; we next slightly sharpen the end of the broken bow *c* so it will rest in the notch in the joint at *e*, and give us a sense of security in holding the frame in the blowpipe jet. The security can be enhanced by driving a small punch into the groove at *c*. The punch should be shaped as shown at diagram *F**, where *g* is an edge view, *h* a front and *j* the shape of the pit or recess which the punch makes. By first grooving the joint at *e* with a small three-square or screw-head file, and then using the groove as a guide to the punch *F**, a pit can be made at *c* which will enable us to hold the frame steadily until it is soldered. The method of holding the joint is very simple: a piece of about No. 45 Stub's wire is filed to a taper at one end and bent as shown at diagram *E**. In this case the little pellet of solder with borax is placed in the recess at *e*, and managed so that when we place the end of the broken bow *c* in the recess at (*e*) it will displace the pellet of gold solder, and leave it exactly in the angle of the joint where it is to flow. We now repeat the soldering shown in fig. 1. By using the process just described we do not shorten the bow but very little, and it is seldom we need to reduce

the size of the glass; but it is better to grind the lens a little than strain the joint. In repairing gold frames, the punch shown at *F** can be used, but the job should be bound on a piece of charcoal, as the gold frame comes too near the melting point to have elasticity enough to make the process just described successful. If steel spec frames are blued they seldom need anything done to them after the soldering is complete; the great requirement being strength, which is enhanced by using gold solder. In cases where so-called bronzed frames are mended it may be necessary to re-polish and re-color, for, as the reader is probably aware, the so-called bronze color on spectacle frames is nothing but heating the steel frames in dry sand until they take on a dark straw color. For re-polishing steel frames, a skein of linen thread rubbed with emery cake (a composition of flour of emery and tallow) will soon make the parts smooth, when a similar skein charged with crocus and oil, or Vienna lime and alcohol, will soon bring up a high polish. The color is now restored by heating, either over a lamp or in a sand bath. Screws for spec joints should be kept in stock, and it pays to keep a good assortment. Usually a stock of spec screws can be kept up by carefully saving all the old frames one gets hold of, and keeping not only the screws but the bows and temples for jobs. In repairing gold specs one does not always have on hand concave wire for bows, and in my next article we will take up an expeditious process of making from common round gold wire. The sink or recess for screw heads in spec joints frequently need enlarging and cutting out; a set of, say, half a dozen rose drills should be kept for this purpose, and also a rose taper to start the drill correctly; but all this we will have to leave over until our next interview.

Reminiscences of Chaux-de-Fonds.

Continued from page 185.



PIERRE JAQUET DROZ had a son, Henri Louis, born at Chaux-de-Fonds, in the year 1752, who, in his young years, not alone exhibited the same proclivities, but also the talent of his father, who therefore instructed him carefully, and then sent him to Nancy to study the necessary sciences. After thoroughly mastering physics, mathematics, music and drawing, Henri Louis returned to Chaux-de-Fonds and worked together with his father, whom he soon excelled in mechanics.

One marvelous piece of workmanship was succeeded by the other, and so great soon became their fame, that a very wealthy man, de la Reynière, whose son had been born without hands, ordered from them a pair of artificial ones. Both went to work and soon delivered a pair with so perfect a mechanism, that the unfortunate boy could with them perform nearly the same movements as with the natural article. Completely overwhelmed with the perfection of this marvel, M. Vaucanson, at that time the first mechanician of France, exclaimed: "Young man, you begin where I would like to end!"

We would never end our description were we to chronicle all the works made by the two Jaquet Droz, assisted by Leschot, another renowned artist, who was a fellow-countryman and friend of theirs. It is impossible, however, to pass in silence over three of their principal automata, "The Musical Girl," "The Draughtsman" and "The Clerk." The former was an automatic female figure, seated at the piano, upon which it played various pieces of music with skill and grace, without being touched by anybody. "The Draughtsman" and "The Clerk" were both of the size and proportions of a boy; the former sat upon a stool and drew pictures with a pencil, by first sketching the outlines and then shading them. He raised the hand occasionally, as if inspecting the progress of his work, at times stopping to make corrections. Louis Jaquet Droz exhibited the automaton at the court of Versailles, and, to the amazement of the whole court, the figure drew the portraits of the King and Queen

of France; this almost incredible feat attracted attention throughout Europe, and subsequently, when he went to England, the King of England desired to witness the spectacle; to the astonishment of everybody the automaton drew—not the picture of the King of France, but that of the King of England.

Our authority states that these "portraits" naturally were not fully drawn specimens, but simply general outlines to be assisted afterward by shading, etc., nevertheless, they were plain enough to show that the portraits of the two monarchs were entirely different, and by a little addition they answered well as copies of him whom they were intended to represent.

"The Clerk" sat at a desk, and, without standing in communication with or being touched by anyone, automatically dipped his pen into the ink and wrote—slowly, of course—but legibly and correctly the sentence dictated to him, in such a manner that every word occupied its proper position, and at the necessary distance from each other. When one line was full he began a new one, and left the proper space between the two. In the performance of this work the automaton moved his head, arm, hand and eyes in a natural manner. But strangest of all, he could be interrupted in the midst of a word, whereupon he stopped, erased the word and wrote a new one.

These facts are on record. The automata were minutely inspected and nothing suspicious was found. Whatever may have been the motive power with which the artist directed the mechanism from a distance nothing is known, as he died at an early age and took the secret with him into the grave. It is suspected, however, that he employed a magnet.

The following episode confirms the suspicion: Jaquet Droz had, in company with his friend, Major Louis Benoit,* been to the fair at Neuenburg. They paused at a place where children's toys were exhibited. Jaquet Droz stopped before a certain toy and studied it long and carefully. The toy was a number of ducks swimming in a basin with water, and following the hand of the proprietor who offered them feed. On the return home Jaquet Droz appeared to be very absent-minded, and, after a long silence, he is said to have suddenly exclaimed: "Mon affaire est faite!" (I have it).

The two Jaquet Droz's educated several pupils, one of which, Jean David Maillardet, of Fontaines, Valley of Ruz, became quite famous in Europe for constructing automata, but the former have until now stood unrivalled.

The younger Jaquet Droz traveled throughout Europe exhibiting his works, and was enthusiastically received in London, where he became the favorite of both the king and queen. The rough climate, however, forced him to return to Switzerland, and together with his friend, Leschot, he went to Geneva in 1784, which made him an honorary citizen—a very rare honor at that time.

The father, Pierre Jaquet Droz, also was compelled by reason of ill-health to leave Chaux-de-Fonds, and to settle in Biel, where he died in 1790. His son survived him only a short time; he contracted a pulmonary complaint and went to Naples, where he died in the following year.

The period of the Jaquet Droz and the first decades of this century was the brilliant period of Chaux-de-Fonds. It is actually surprising to trace the astonishing development of the watch industry there, furthered in greater part by its own citizens and assisted by those of Neuenburg. The success of this high valley operated like a charm upon the other portions of the then principality (now canton) of Neuenburg, and the whole country could soon be likened best to one vast workshop, the center of which was the former insignificant and impoverished huntsman's hamlet, Chaux-de-Fonds. If Jaquet Droz had given the incentive and perfected its watch industry, it was soon to receive another powerful impulse by Ferdinand Berthoud, a citizen of Neuenburg and Valendis, who was born in the

Valley of Travers. After having studied mathematics and horology thoroughly he went to Paris, where, by the invention of his marine chronometer, he not alone attracted the attention of artists and scientists, but his experiments and studies in horology caused a perfect revolution in the construction of the watch and the overthrow of many antiquated ideas and prejudices, and it may truly be said of him that he became the founder of the present perfected French watch and clock industry.

His numerous works and writings, all distinguished by a clear style and thoroughness, were read carefully by his Swiss countrymen, and stimulated them to emulation. Ingenious and talented men were not wanting who took up one or the other point mentioned and perfected it. Among these may be Olivier Quartier (born in 1776, died in 1852), who perfected the branch of horological drawing; another great mind was David Henri Grandjean, born in La Sagne in 1774, who for a time lived in Chaux-de-Fonds, but subsequently settled in Locle, and largely worked for the Brazilian market. He constructed many artistic automata, one of which is still treasured in his family. He was also the inventor of the rounding and cutting machine. It is true that this machine was already in use in Geneva, but it was jealously guarded as a secret, and Grandjean was actually forced to invent it, as Jean Richard had to do with the dividing plate. His most praiseworthy trait was that he never kept any one of these useful inventions secret from his fellow-workmen, but freely permitted them to copy them. He died in 1845 at the age of 71 years.

(To be Continued.)

Frauds in Precious Stones.



THE question whether there is as much fraud in colored stones as there is in diamonds, an expert answered: In comparison to the stones of both kinds that are sold, the fraud in colored stones is much greater than in diamonds. There is a system greatly in use by which rubies, sapphires and emeralds of inferior color are made to imitate the fine Oriental stones. This is done simply by coloring the culdrt, or point, with a lasting solution of the true tint. This gives the whole of the stone the desired appearance, and when it is set, no expert can discover the fraud until the stone is loosened. Even when loose I would not undertake to discover the manipulation in every case. As an example, last year I bought, during my periodical visit to London, what appeared to be an extraordinary ruby, weighing about three and one-half karats, for which I paid over \$1,500. We had it in stock for about four months and had shown it to some of the best judges. Not one of them had found fault with anything about the stone, except the price. Finally my head man, while showing it to a customer, had his suspicions aroused as to the genuineness of the color. After a deal of trouble we at last got the stone into its natural state, and found that it was worth about \$7.50. I returned it to the firm I had bought it of, which, fortunately, was responsible. The firm lost nearly the whole amount, as its buyer had purchased the ruby for cash in the open market at Amsterdam. This is the only instance where any large amount was at stake that I have met with during the last few years. Respectable jewelers are always more particular from whom they buy their colored stones than their diamonds.


The second branch of deception is the "doublet" method. The method of manufacturing doublets is of a very old standing can be traced back to the fifteenth century, and was first described by Cardan, who said: "A fraud of a very bad character, and one very difficult to find out, was employed by Zocolino. This venerable personage used to take a thin flake of real precious stones, such as ruby, sapphire, etc., when he wished to imitate those stones. He choose such pieces as had but little color and were consequently

* Louis Benoit was an artist, celebrated as a miniature painter and enameler, to whose ingenious experiments the watch industry of the Neuenburg Jura owes its development of dial painting.

very cheap. Underneath he placed a piece of crystal or strass (the finest flint glass) sufficiently thick, and united the two parts by means of transparent cement, in which he incorporated a coloring matter in harmony with the stone in process of manufacture. In this way this magnificent workman deceived everybody, even the lapidaries." This same method is still in vogue, though, of course, it has been brought to greater perfection. The cheaper kinds of doublets are made now without any real stones at all. The lower part is strass, the upper quartz, and they are joined, like the others, with transparent colored cement. Even these stones, when set, have a beautiful appearance and stand the ordinary file test. There are an immense number of doublets in use. Almost anybody can be deceived with the finest quality of doublets.

When they are set by a clever workman it is impossible to distinguish them from the genuine article, and often when they are out of the setting it is a hard matter to decide with certainty. I will give you an instance that is hardly creditable to me, for I have been in this business all my life, but it will be a better illustration of the necessities of our trade than an hour's general conversation. About two months ago a lady brought me a magnificent set of emeralds, comprising brooch, ear rings and pendant. She wanted the two ear ring stones altered in shape and the whole reset. I undertook the commission and completed the cutting. After the cutting was done, on looking at the stones my suspicions were aroused, and I thought it just possible that they were only doublets. When the lady called I asked her how much this set of jewelry had cost. She informed me that her husband had purchased it while making a tour, for \$1,200. This strengthened my suspicions, as the emeralds, if genuine, would have been worth at least from \$5,000 to \$6,000. I told her my doubts, and she insisted at once on a full test. It was one of the hardest jobs I ever had. I had given it up and pronounced the stones real after working for about an hour. But later, by a very exact experiment, I found the lower part was lighter than the upper, and I at last demonstrated that they were doublets, but the very finest that could possibly be produced. The lady afterward sent them to another firm, which, after a week's investigation, sent back a report to the same effect. I have often had some difficulty in deciding as to the genuineness of a stone, but I never saw any jewels that puzzled me so much as those emeralds.

Simple Gauge.

HEN TURNING in a cylinder, balance staff, etc., says H. M., in an exchange, I have for a long time made use of the following described gauges, which, in spite of their simplicity, are thoroughly practical, and can be easily made by any watchmaker. Their construction is very simple and requires no illustration.

I will commence with the description of the gauge which I use, when turning in a new cylinder, for measuring the height of the passage and of the balance. It is made of a piece of blue hard steel wire, fully 1 millimeter thick and 60 mm. long, both ends of which are provided with fairly long, very thin and tapering pivots. A fully thick pivot drill, from which the ferule has been taken off, can be used for this purpose. Upon this wire are mounted two easily movable brass shells, 10 mm. long and of 4 mm. in diameter. Each of these shells or pipes is provided with a screw in order to fasten it thereby at any desirable place of the wire. One of the shells, which is to be used for ascertaining the height of the passage, is at its lower end filed slightly bevel on two sides, somewhat like a screw-driver, although not quite as sharp, so that it still retains a small face. To the other shell, which is to be used for measuring the height of the balance, is riveted above at right angles a small strip of brass of the thickness of an ordinary thin balance.

In order, now, to measure the height of the passage, place the

lower pivot of the gauge into the lower cylinder pivot hole, and slide the shell so far down that its flattened sides, which have been turned in such a manner that they pass through between two teeth of the cylinder wheel, stand so close above the bottom of the wheel as the passage of the cylinder is intended to pass above it. When this has been determined precisely, the shell is by its screw securely fastened to the wire, and we have in this way an exact and unchangeable measure for the height of the passage.

When the lower cylinder pivot has been prepared thereby, another examination of the correctness can again be instituted. The cylinder pivot is placed upon the lower small face of the shell, and it will then be seen, provided that everything has been made correct, how the pivot point of the wire cuts off straight with the upper side of the passage.

In order to measure the height of the balance, reverse the instrument, insert the pivot on this end into the lower cylinder pivot hole and push the shell with the brass strip, which is now below, so far down that it passes fully free above the cylinder wheel bridge; then tighten the shell with the screw and you have now the very exact height for the balance.


It is self evident that before these measurements are undertaken, the lower cap jewel has to be examined whether it is in order, and, moreover, that it is screwed on.

The other instrument which I use when turning in cylinders and balance staffs, serves for the measurement of the pivot lengths. It equally consists of a thin, blue, hard steel wire, with two very feebly tapering, fairly long pivots, the points of which must be rounded off in the manner as described for the first gauge. In order to find the precise length for the two pivots of the cylinder of the balance staff, take two pellets of soft wax of the size of a small glass bead, and place one upon each pivot of the gauge, so far that the pivot points just pass through, press the wax in place, and with a sharp penknife sharpen its points like a pencil. When, now, the two cap jewels, the upper and the lower, are in order and screwed on, one of the pivot ends is placed into each pivot hole, it is turned round slightly by a gentle pressure, until the pivot points have reached the cap jewel. In this manner you will obtain the very exact length from the sinks of the jewel holes up to the cap jewels.

It is easy, now, to make the pivots of the cylinder, etc., sufficiently longer than their shoulders stand clear and free from the sinks of the jewel holes. Pivots of the right length may at once be made in the same manner, so that everything must fit at once.

A mark to readily distinguish the upper and lower ends is to be made upon the gauge with a file or other instrument, so as not to mistake the ends.

New Method of Fastening the Female Stop in a Watch.

UCH, SAYS O. L., in the *Deutsche Uhrmacher Zeitung*, has been said in our horological press about the stopwork in watches, still I have never found yet a better fastening of the ordinary Maltese cross, although it is well known that the usual manner of fastening by means of a screw is simply a source of many errors. Without taking into account at present that the screw in thin barrel covers is so short that it barely offers sufficient security for the female stop, it nevertheless requires a very exact fitting if the stop has to have a uniform motion and the necessary retention in place. Every watchmaker, however, knows to his satisfaction in how far the average quantity of watches comply with this condition of affairs. In the following, I am so bold as to lay before my colleagues a manner of fastening the female stop, as I have practiced very successfully for the last ten years.

I first brooch the hole in the stop round, polish it with a round brooch and grind and polish the lower face. After I have with the

countersink made upon the upper face a medium deep sink, I set the depthing with the male stop true, and drill the hole for centering the pivot as small as possible so as not to weaken it unnecessarily. I then turn the pivot to correspond to the hole in the female stop, and with the countersink I make a correspondingly deep sink above, whereby the small hole in the pivot serves as guide, and press or hammer, by setting a fitting round punch upon it, the rim of the pivot, which remained standing, into the hole of the stop. Should it move a trifle too stiff, it can be eased with a little oilstone dirt and oil until it turns without pinching. The female stop is by this method fastened much more securely; beside this it requires less time than the fitting in of a screw, and offers the further advantage that the pivot, around which the stop revolves, is far stronger; no screwhead can scrape either on the dial or on the barrel bridge, and no screw, projecting into the interior, can occasion pinchings of the spring.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

The Chicago jobbers all round are feeling better than they have done for many months, and are now looking forward to the approaching fall trade with great expectations. The reports of failure of the crops in the Northwest discourage but little, for if prices of produce do rule higher, the trade confidently expects that the favored classes who make the money will spend it in proportion. Business during July has been steadier and better than the average, and all the indications are for improvement right on, and a brisk and early fall trade. While some jobbers do not anticipate that the fall trade will open so early or prove so rushing as others declare it will, all are united in predicting that better times are ahead than have been known for some years. Stock is being taken, catalogues are being rapidly got ready, and a good deal of buying is already being done to catch the early fall trade. Collections, generally speaking, have been exceptionally good for July, though, of course, not a few dealers have been begging off and complaining of the tightness of the times. In Minnesota and Dakota some of the leading jobbing houses are doing better business than for months before. Most jobbers report things better in Illinois; and in Nebraska there has been a considerable revival of trade, and the fall outlook is most encouraging.

Mr. Allister, of B. F. Norris, Allister & Co., gives it as his well considered opinion that a great revival of trade is to be experienced this fall. In conversation with your correspondent he said: "We're looking for another 1881 boom, and this time we'll be in much better shape to handle any rush that may occur. The jobbing business is better systematized, stock is more accurately kept, travelers are more experienced and better paid, and country dealers know far more readily what they want to buy. We can now sell a man a \$1,000 worth of goods in four or five hours less time than we could do in 1881. I confidently expect that trade will shortly catch up just where it dropped off during the labor troubles, and believe that the regular fall trade will set in early in September." Mr. Allister's views are considered a trifle too roseate by many others in the trade, but all devoutly hope that they may prove correct. Benj. Allen finds trade keeping up, but reports no material improvement. His collections are up to the average, but a good many complaints of dullness of trade keep coming in from all parts of the country. He thinks that the crops, which will be largely under the average, will cause tighter times, and that unless the demand for jewelry prove big the tendency in prices will be down. Otto Young & Co., Giles, Bro. & Co., Stein & Ellbogen, all state that business has kept up remarkably well for the summer, and agree that

the indications for a good fall trade seem to be unusually favorable. Cogswell & Wallis, while not finding business particularly rushing, admit there is more life and less growling all around. All the big jobbing houses report business to be good, and it is safe to say that the summer trade is the best for four years. The drouth and floods which have checked production are, fortunately, only local, and can hardly affect business disastrously, as their tendency will be simply to stiffen prices.

Benj. Allen is contemplating great improvements on his store. He will shortly take in the entire first floor of the adjoining building, and so form, perhaps, the largest and finest jobber's warehouse in the city. It is his intention after the completion of the improvements to vacate the upper floors which he at present occupies, and do his entire business on the one commodious floor. The building will also be fitted with one of the latest and most approved elevators. Mr. Allen is spending a goodly portion of his time at Oconomowoc, Wis., where his family are in summer quarters.

B. F. Norris did not arrive in Chicago from San Francisco until Monday, July 19. Mr. Norris is investing considerable money in new buildings in San Francisco, and owing to some delay in their construction through the burning of a planing mill. He is in pretty good health and feels well satisfied with the condition of business.

J. M. Cutter, of the Elgin Watch Co., Mr. Purple, of Holmes & Edwards, and Mr. Wallis, of Cogswell & Wallis, are East enjoying the Atlantic breezes and looking after their business concerns.

Chicago, the great summer resort of the West, is at present the headquarters of legions of representatives of Eastern manufacturing houses. The Palmer House literally swarms with them, and from their uniformly cheery appearance it would seem that they are all doing a rushing business.

Messrs. B. F. Norris, Allister & Co. discovered July 8 that Jack Weisbrod, an employee of two years' standing in their optical department, had been systematically plundering them for some time. The firm was informed by a former employee that Weisbrod was in the habit of carrying opera glasses, gold spectacles, etc., from the store, and had been seen repeatedly to hand them to a friend named Ernest Joslyn, a dry goods clerk out of employment. Joslyn was watched, and it was soon discovered that he deposited the goods with various pawnbrokers in the city. The services of the Pinkerton National Detective Agency were called in, and Weisbrod, under a little pressure, admitted his peculations. He pleaded in extenuation that he had stolen the goods in order to help out his friend Joslyn who had been out of work for three months. The excuse was regarded as altogether too thin, and Weisbrod and Joslyn were both arrested and held for trial to the next term of the Criminal Court. The exact amount of the stealings cannot be determined by the firm, but it will not exceed \$500.

Business in the city retail trade has been fully up to the mark and very little growling is heard around. Jobbers and retailers are congratulating themselves that they have not been drawn on the jury which is now trying the anarchists who instigated, if not actually carried out, the diabolical Haymarket massacre on the 4th of last May. There is a sense of relief among the public that the men whose action, besides working havoc and destruction to life, had an almost paralyzing effect for a time on trade, have been brought to speedy trial. A verdict that will consign the destroyers of law and order, if guilty, to the scaffold or penitentiary will do much to allay disquiet, restore public confidence, and, as a necessary consequence, improve trade. Business seems even already to be picking up at the point where it was virtually killed some months ago by the labor troubles and the anarchist conspiracy.

W. A. B.

Trade Matters in Providence and Vicinity.

To the Editor of the Jewelers' Circular:

Somewhat contrary to expectations the trade in July showed something of its old-time vigor; it started in quite favorably as to point

of sales, and there has been a general expression of satisfaction in that respect; but to offset this is the cry of dull collections; that nearly every one is ready to buy but not so willing to pay; this necessitates a degree of caution on the part of the producers who are scrutinizing credits more closely than ever, and the quantity of goods being shipped is not up to the amount of the purchases in consequence.

For some unexplained reason there has been a more than average number of firms starting in jobbing trade this season than formerly. It occurs to the wise manufacturer that there is already a sufficient number in the trade, and certainly all that the business will allow. Some of the new houses may be termed experimental, and are subject to the "weeding process" before they grow to a mature age; this, of course, occurs in all trades, the undesirable are obliged to drop out when we look for good ones to fill the gap. There is probably at this time more money due to the manufacturer in the jewelry line than in any other; by this is meant the money "long past due," and there is less disposition on the part of the jewelers to prevent this than in any other line; they can all grumble and "kick," but they fear to "demand" payment as manufacturers of other commodities do. One manufacturer stands in awe of his neighbor or his especial competitor, and fears to "push a payment" lest the other may profit by it. It would not be a very long battle if the manufacturers would unite upon a certain time for payment, and insist upon the date before the jobbers would understand what was meant by the diction. The Board of Trade have attempted a plan for the suppression of evils in the trade; among the abuses mentioned is this subject of payments.

Can it be successfully carried through?

We think it can.

On Sunday, 4th inst., a fire occurred in the "Curry Building," No. 407 and 409 Pine street, in which is located the shops of several well known manufacturers. The most serious damage was to the firm of Capron & Co., in whose shop the fire is supposed to have started; their loss has been placed at \$3,000 to \$4,000, mainly on machinery. The other losers were P. S. Eddy, Ph. Riley and C. L. Potter, water and smoke being the direct cause of their loss which is small; it is quite fortunate the fire did not spread to the other side of the building which is occupied by Crossin & Tucker, Arendt, Meister & Co., and R. L. Cutting & Co.

There has been but one failure during the month that affects the Eastern manufacturers, and that is the failure of Sol Kampe, of Cincinnati. He is understood to owe in Providence and Attleboro some \$5,000 of his total liabilities of \$9,000, minus the preferences of \$2,500. It is thought the estate cannot pan out sufficient to pay the preferences, although he has announced he will pay a cash dividend to the unsecured creditors. Quite a number here have a remembrance of Kampe's former failure, when the estate paid absolutely nothing, and some are now taking the second bite from the same cherry. It does not require much argument as to the wisdom of permitting such people to long continue in trade.

At last the case of the Boards of Trade vs. Jos. S. Gratz and A. Shakman and Lowenbach has come to an issue, by the payment to the Boards of \$12,000 in cash. It is understood that this money is to go to the payment of the debts of Gratz to such creditors as are members of the two Boards. The claims of Providence are between \$11,000 and \$12,000 and New York about \$8,000. The agreement entered into between the attorneys for the two Boards and attorneys for Gratz and Shakman was, that the legitimate members of the Board should be paid, and that considering the New York Board's attorney had in his hands something like \$4,000 of claims represented by outsiders, that New York should subdivide with the outsiders in their proportionate share of the proceeds. Providence attorneys had none but legitimate members' claims, thus they will share better than the members of the New York Board.

The prime movers in this case deserve a great deal of credit for the manner in which they have conducted it; there was considerable

feeling manifested by non-members of the Board as to what they termed Boycott vs. Shakman, as they thought it materially affected their interests, but they now say the Board did a grand thing, and some of them wish they had become members long ago so as to have profited by the arrangement. The entire jobbing trade have watched the progress of the case, and the better class of these say a great deal of good has and will be shown by the determined and united action of the manufacturers. By the settlement of the matter it gives one more buyer this season (to those who can sell him).

Messrs. Dutee, Wilcox and Walter E. White, who have been absent on a pleasure and business trip to Europe, returned last week and report having had a pleasant trip.

Mr. E. S. Horton, of Horton, Angell & Co., Attleboro, Mass., left on Thursday, July 22d, for the grand encampment of the G. A. R., to be held at San Francisco next month. Mr. Horton, more familiarly known as Major Horton, was Captain Co. C, 47th Regt., Mass. Vols., and Major 58th Regt., Mass. Vols., and now Past Commander Streeter Post, of Attleboro; this is his first visit to the Pacific Coast and he consequently anticipates having a good time.

The Board of Trade is progressing as it deserves; new names are being added to the roll of membership, and it has all the indications of a long life. The reports as issued by them give facts and figures which other agencies do not or cannot give; it is without doubt the agency for the manufacturing jeweler whether located here or at a distance; why can't they give information and serve the manufacturers in Newark, N. J., and throughout the whole of New England. The Secretary should secure members outside of the territory now covered.

Nathaniel Grant, the well known manufacturing jeweler, gave a trust deed of his property July 20 to Mr. Frank H. Bliss, the New York representative of Mr. Grant. The deed conveys to Mr. Bliss all of Mr. Grant's estate, "real, personal and mixed," for the purposes named in the trust deed, the trustee to have all the property to manage and improve as he shall deem for the best interests of the trust estate, with full power to invest and re-invest, except that he shall not sell without the consent of Mr. Grant, Mrs. Grant or their children, the house and lands on Broadway, which the family is to occupy rent free. If, however, they should cease to occupy it the trustee may rent it. The trustee is to carry on the manufacturing jewelry business under the firm name of Nathl. Grant & Co., with full power to sign checks, etc., and all of the income of the business over and above the expenses, including the compensation of the trustee and the mortgages on the Broadway property, is to be paid to Mr. Grant. In the event of the death of Mr. Grant before the said trust shall terminate, the income is to be divided equally between his wife, Elizabeth, his daughter, Jennie A., and his son, Harry L. Grant. The latter, when he shall attain his 21st birthday, is to become the business associate of the trustee.

Provision is also made, in case of the death of any of the persons interested, for the disposition and management of the estate. The consideration named in the deed for the conveyance of the property is fixed at \$1, and the deed continues in force for the period of 3 years from date (July 16), at the expiration of which time the then trustee or trustees shall, upon demand from Mr. Grant, convey to him absolutely and in fee simple all of the property mentioned in the trust deed. This act was done by Mr. Grant to centralize his business interests, and not in consequence of any financial difficulty.

BERNARDO.

Condition of Trade in Philadelphia.

To the Editor of the Jewelers' Circular:

The spirit of enterprise which H. Muhr's Sons infused into the jewelry interests of Philadelphia when they built their business palace on North Broad street, replete in every appointment that architectural skill and building art could suggest and devise, has only

begun to bear fruit. That firm deserves credit and special mention. They are being followed by Bailey, Banks & Biddle, of 12th and Chestnut street, who will shortly complete a splendidly equipped establishment for the extension of their business. This firm is an old one, too well known to call for much description in a trade journal. They intend to put themselves in a position where their facilities will be second to none. We hear it rumored that other firms will, in a short time, make extensive improvements and additions. The industry of watch making and jewelry manufacturing in general, certainly calls for more of a display, not for the sake of display, but for the sake of dollars and cents. All our leading houses are doing a good business. The market is being more carefully studied. In years past the jeweler has considered his vocation almost a profession, and, in some instances, this feeling has gone so far as to produce a rigid conservatism which was almost death to enterprise. Advertising was overlooked. Even the display of goods was considered as a vulgar bid for a cheap trade, which they affected to despise. Perhaps this strange spirit has not been manifested in New York or other cities, but it certainly has been in Philadelphia by the older heads who, perhaps, unintentionally followed in the wake of the old time court jeweler whose business it was to gather the finest works of the jeweler's art, more as a matter of art than matter of business. All this has been changed. New business methods have been devised and pushed, and we have even developed new methods so far as to build up quite an extensive business in the selling of watches and jewelry like furniture on installments. There are several houses doing business of this kind, not first-class, of course, but their business is expanding and they are likely to find imitators. There are hundreds who are willing to carry watches which cost them only a dollar or two a week, and who, but for such a convenient system, would never be the possessors of these hard to tax articles.

It may be a matter of interest for your readers to know that there are not over 40,000 watches in all in this city, so far as our taxable returns go to show. Our jewelry interests show an annual business of about \$2,000,000, including fancy cases. Within a year or so special efforts have been made to extend the Philadelphia jewelry trade into far off States, West and South. The success which has followed this departure is leading to the display of a little more energy in that direction. Philadelphia's trade with the West is becoming quite an item. The manufacture of watch cases has grown very rapidly within two or three years. The cost has been reduced and the workmanship has been greatly improved.

The industry has passed through its striking season with very little harm. The trade is not without its organizations among its workmen, but, as a class, they are not of the agitating sort, and are content with their good wages, steady work and generally congenial surroundings.

There is a great deal that might be said concerning matters of purely trade and shop interest, such as new designs, etc., but each shop regards these as its own special property, and feel most favored when the least is said concerning them.

One of the difficulties with which we have to contend is the manufacturer who does not follow a legitimate trade, or rather who does not produce legitimate goods. Considerable trash is thrown upon the market at prices which forbid competition between honorable jewelers. The low prices prevailing for watches and jewelry in general broaden the demand and thus stimulates a demand for inferior goods. Some sort of organization is felt to be a necessity, but the progress which has been made has not been commensurate with the evils to be overcome. The outgoing salesmen are full of confidence with reference to the coming season's business. The results of the past few months have stimulated all legitimate manufacturers and they are greatly encouraged.

The early closing movement has been a success after a long and active campaign upon the parts of the friends of the movement. The Saturday half-holiday has been confined chiefly to the retail dry

goods stores, but as yet not extended to the jewelry stores to any great extent. The result of the half-holiday movement is that more business is done on Friday afternoon and Monday morning. The movement is likely to increase.

QUAKER CITY.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of June 15, 1886.

- 343,629—Clock. J. H. Eastman, Boston, Mass.
 343,976—Clock Movement, Electric. P. Lange, Assignor to E. W. Moore, New York, N. Y.
 343,947—Clock Winding Mechanism. A. Craig and J. H. Eastman, Assignors to the Boston Clock Co., Boston, Mass.
 343,576—Watch Case. W. M. Evans, New York, N. Y.

Issue of June 22, 1886.

- 344,209—Clock, Twenty-Four Striking. C. Stahlberger, Assignor to Waterbury Clock Company, Waterbury, Conn.
 344,026—Watches, Stem Winding Mechanism for. W. Bell, Boston, Mass.

Issue of June 29, 1886.

- 344,584—Clock Movement. F. A. Lane, Assignor to the New Haven Clock Company, New Haven, Conn.
 344,479—Clocks, Record Sheet for the Dials of Watchman's Time. O. E. Hausburg, New York, N. Y.
 344,423—Timepieces, Dial for. R. Tragarth, Chicago, Ill.
 344,727—Watch Case Hinge. O. A. Drinkwater, Boston, Mass.

Issue of July 6, 1886.

- 344,932—Clock, Mechanical. O. Rebentisch, Salem, Va.
 344,859—Watch Case Hinge. F. Rapp, Chicago, Ill.
 345,226—Watch Case Spring. W. Fowler, Philadelphia, Pa., Assignor to Keystone Watch Case Company, of the same place.
 345,192—Watch Case Spring. R. L. Stuftt, Scottsdale, Pa.
 344,838—Watch, Stem Winding and Setting. C. Kistler, Sterling, Ill.
 345,231—Watch Winding Mechanism. H. F. Hamburch, Hamburg, Germany.
 345,055—Watches, Pendant Stem for. E. F. Heffernan, Toronto, Ontario.
 345,193—Watches, Stem Winding and Setting Mechanism for. R. L. Taft, Assignor to Illinois Watch Company, Springfield, Ill.

The Retail Dealers' Protective Association.



THE FOLLOWING is the agreement which constitutes a part of the Constitution of the Retail Dealers' Protective Association, recently formed in this city:

"The members of this association pledge themselves, as far as possible, to favor with their patronage such wholesale dealers, manufacturers and jobbers only, whose mode of doing business is in accordance with the requirements of this association, and to purchase of or trade with no dealers or manufacturers who sell goods directly or indirectly at wholesale or retail to any others than those engaged in the legitimate retail jewelry trade eligible to a membership in this association, or to such jobbers or wholesale dealers who have pledged themselves to do likewise."

A circular has been sent out to the trade as follows:

"DEAR SIR—On the 27th of last May an organization was formed

under the above name, for the purpose of self-protection and that jewelers may meet frequently; quarterly meetings will be held for the purpose of hearing what work has been performed, and receiving such suggestions from the members of the organization as may help to promote a better trade for legitimate dealers. The wholesale dealers, manufacturers and jobbers generally favor our object, and we confidently hope to see every manufacturer and jobber in the country acting in harmony with our organization. We will convince them that it will be to their interest to do so. The number of letters received from all parts of the country, expressing their approval of our work, is of a most encouraging character, and when we have gathered in all of our own jewelers in this vicinity, we expect to extend our work to other parts of the country.

We therefore request that you will give our Secretary instructions to place your name on the roll, by forwarding the initiation fee of \$3 and annual dues, \$2, payable in advance, which makes you a member in good standing until our next convention in May, 1887. Forward your check to the Secretary, payable to A. D. Wilson, Treasurer R. J. P. A.

Hoping to hear from you soon we remain,
Very truly yours,

BERNARD KARSCH, *President*,
A. D. WILSON, *Treasurer*,
M. D. GALLAGHER, *Secretary*."

Communications addressed to the latter at No. 649 Sixth avenue, will receive prompt attention.

Free Hand and Mechanical Drawing.

BY EXPERT.



THE WRITER promised in last communication to give a method for ruling parallel lines gradually approaching each other, such as are used to represent cylindrical surfaces; but on consideration he concluded this would be better expressed and understood by cuts or illustrations in which positive black lines were used. But previous to introducing this radical change in the style of our illustrations, it is well to write up a sort of dissertation on the power and scope of pen drawing, both in its application to free hand and mechanical efforts.

Free hand pen drawing has been practiced by almost all our most eminent artists for the past 200 years, but it is only recently, under the auspices of photographic reproduction, that it has been brought to its present advanced state, and still it is only in its infancy; but it has so many desirable features it is bound to take an advanced position in the graphic arts. In sketching and drawing from nature a pen is eminently portable and convenient, and is powerfully expressive in the hands of the skillful artist. The "method," "manner," "handling," "technic," the latter being the best term, which means the mode or manner of arranging and making the pen strokes of pen drawing is the difficult part of the art. A study of the power and capabilities of the pen as an instrument of delineation in drawing is of great importance; it is, in players' parlance, *immense*, but it lacks power in giving tone and texture. This defect can, in a measure, be overcome by combining an India ink wash over parts of the drawing. As, for instance, we can wash in the sky and clouds and broad masses of shadow, then accentuate with strong, vigorous pen strokes. Such drawings can be worked up to fine effects, but the great drawback in such pictures is they can not be reproduced by any photo-engraving process, wherein if we use simple pen lines we can, at a very cheap rate, have any design photo-engraved. Drapery and all broad masses of shadow are very difficult of execution with a pen, and for this reason are generally avoided as much as possible. Pen drawings for reproduction (by photo-engraving) should be made larger than the intended print, as, for instance, we wished to make a

cut 3x4 we should make the drawing 6x8. Such a drawing would generally be called twice the size but in reality it is four times the surface. By making a drawing larger we can make our lines fuller and firmer. A piece of Bristol board should be selected for all finished drawings, but for practice any smooth surfaced white paper will answer. In outlining a fine pointed hard (H. H. H.) pencil can be used, but the lining should be as free of details as possible—in fact, only suggestions as one might say, because in modern pen drawing outline, as we defined in a former article, is in a great measure ignored. Trying to make a pen drawing to resemble an old style of etching is not the way to proceed. Rather study to convey a sense of the masses of light and shade. Form and texture are difficult of expression in pen drawing. I used the phrase *tone and texture* a few lines above. I might as well explain what was meant in both cases. Tone is more particularly applicable to painting than drawing, but in drawing it would imply the general effect of a picture in regard to breadth and contrasts of light and shade. A drawing with few strong contrasts (of light and shade) would be pronounced of subdued or low tone. In pen drawing it is impossible to produce broad surfaces of precisely the same tint; it will be patchy and uneven in effect, even when attempted by the most skillful artist living. Consequently in pen drawing all broad surfaces should be avoided as much as possible, but in cases where they must positively be shown, the white paper must stand to represent such surface. Texture is best illustrated by drapery; clothes of all kinds are hard to delineate in pen drawing, and can only be well rendered by a careful study of the folds and sway of the drapery. Form, the remaining term used, implies what is generally termed outlines; but the writer has hinted before that a crude outline does not express form truthfully. To illustrate, we can conceive of no stronger contrast than by contrasting black and white. Well, we will suppose a pure white wall is ten feet distant from us and placed immediately in front, and between us and the wall is a black ball six inches in diameter. Now, the ordinary observer, if asked how he would delineate the ball if he was making the drawing of it, would not hesitate to say, take a pair of compasses and sweep a circle and fill this in with black, as the ball is (in imagination) perfectly black without any shadows or reflections. But, in fact, this would not do as we are double-sighted, or, as the scientists term it, binocular, we would see to a certain extent around the ball; with the right eye we would see more of the white wall to the right of the ball than would be possible to see with the left eye, and so *vice versa* we would see with the left more to the left of the black ball. Here we would have two images of the ball superimposed on each other, with the edges to left and right overlapping each other. Consequently we see that such a thing as a positive definite outline does not exist. Again, if we should place behind the black ball already instanced a black screen or wall, theoretically they would be both black, giving off no light, but practically even under a moderate illumination they would give off light enough to define, and separate the two objects as to extent and general form; but there would be points at which the eye would fail to distinguish which was the ball and which the background. All this would be equally true if it was a white ball against a white background. These extreme conditions are selected to induce the reader to consider and think (and thought implies comparison and analysis) for himself. No work on art can be compiled which will give the student thoroughly correct ideas in regard to drawing of any kind. Every artist must have his own method of expressing objects pictorially, as marked and distinct in character as writers have in description. This is particularly true in pen drawing; we are using a very convenient instrument which is limited as to scope and extent of power. Some readers may say, then, why not abandon such a method and choose some other? To such I would say the writer did not intend these instructions for persons who intended to devote themselves exclusively to art, but for such as have a taste and desire to express themselves pictorially. And to those persons the writer has endeavored to set them on the right road, and offer the student

the ready means and material to afford him progress. And again, if these instructions should by accident induce any young reader to adopt art as an occupation, the writer would wish to impress ideas which would certainly not be superficial and erroneous. A few words more on expression of form. Form is seldom or never best expressed by a positive outline, but rather by *contrast and suggestion*. These terms will be further explained as these articles progress. Among the difficulties with which pen drawing has had to contend were established methods of pictorial expression by engraving. The artist with a pen would imitate the methods of the engraver. And these (methods of the engraver) would afford the art student much amusement, if not instruction, if they could be carried back through the development of metallic and wood engraving. The writer will here only make a brief *resume* of the methods of engravers as they influence pen drawing, reserving the privilege of further pursuing the subject through the pages of this journal, which is becoming so prominent an art journal, especially so in arts so mechanical as engraving in all its applications. The development of line engraving is a study in which all art lovers must be interested, and in our next article we will consider how the style of engraving known as the black line method was developed and its influence on pen drawing.

Balance Springs, Curved and Flat.



WHAT DOES a watch require to enable it to preserve its regular rate for a long time? Its balance wheel must be as free as possible. This is obtained principally by means of the balance spring, the action of which is most concentric to the axis in all its parts, thereby exerting the least possible quantity of side pressure in its pivot holes. This can more easily be obtained with a curved balance spring than with a flat one, in which assertion all adjusters will probably agree with me. Other things being equal, watches with flat springs have a shorter balance wheel motion (consequently less force) than those having curved springs. I recently had a striking confirmation of the truth of this with three anchor watches which I had to regulate. One of them, with a curved spring, had a much finer motion than the other two, which had flat springs.

An evidence of greater freedom for the balance wheel with a curved spring was furnished me by several other watches which I had to repair, in which the balance wheel pivots were completely worn out, either on account of the poor quality of the oil or because of an insufficient quantity of it. Despite these defects the watches had continued to run for a long time, until the pivots, in wearing out, produced a blackish powder, and finally broke, causing the balance wheel to stop. One of these watches had been running regularly for four years before the accident occurred. I do not remember ever having noticed such endurance in a flat balance spring, for it would cause a watch to stop before the wear had so far advanced.

In order, now, to arrive at reliable conclusions on the comparative merits of the several balance springs and to put an end to discussions on the subject, especially as regards the constancy of adjusting, would it not be possible by experiment to arrive at positive knowledge? For instance, twelve anchor watches should be constructed of the same size, equal in respect to movements, escapements, balance wheels, and lubricated with the same oil, the only difference being in the balance spring, which would be curved for six movements and flat for the others. They should be adjusted by two adjusters, according to their preference for one or the other kind of balance springs, in order that emulsion might guarantee careful work. The pieces being finished, they should be placed in an observatory for two years. After the usual trial they should simply be wound every day for a year without any comparison being made; after that time they should undergo a new trial as in the beginning. A report of this second trial should be made and compared with the first; then

the watches should be wound up every day for another year, at the end of which time a last trial should be made similar to the two preceding ones. At the expiration of these two years the watches should be withdrawn and a comparative report made as to the results of the three trials.

Such an experiment, I am sure, would be of great interest on account of its instructive and positive results. To give to these tests a greater value it is to be desired that the balance springs used, flat or curved, should be made of the same steel, and be of the same temper in order to add another guarantee to this rigorous equality of conditions in which all these movements should run, for it is well established that the degree of temper of a balance spring, acting on its elastic properties, can modify, with time, the running of a chronometer. Professor Thury explained this in the interesting lectures which he delivered several years ago, by demonstrating that the elasticity of untempered steel is weakened by constant work, while, on the contrary, the elasticity of tempered steel is increased by the same work. It is this that partly explains the acceleration of many chronometers with cylindrical or spherical springs, which, after being perfectly regulated, run from 10 to 12 seconds fast per day, although the oil has been changed. Therefore, if we could also add two or three watches with cylindrical springs to this new test of regulating, it would make it the more conclusive.

As to the expenses occasioned by this test they would, perhaps, not be very great. The movements would lose nothing of their value during these two years, but would probably gain, according to the results obtained.

It would be very easy to arrange these details if the ideas were taken into consideration. We live in a time when industrial progress is facilitated by competitions and expositions, and to do away with hypothesis we must have facts based on practical experience. What I propose has never yet been done, and I am convinced that it would add the stamp of successful demonstration to that which theory already affirms.

I must, however, in conclusion call attention to the advantages of the flat balance spring in cheap anchor watches, as they run the greater risk of falling into the hands of unskillful repairers, who, finding the curved balance spring much more difficult to the repairer than the flat, often return watches containing the former in a poorer condition than they receive them.—[M. Philippe, in *Journal Suisse d'Horlogerie*.

Wheel Protector.



WHEN IT IS necessary, for the purpose of drilling in a pivot, to soften the one end of the pivot or of the balance staff, the wheel or the balance must be protected against being heated so that these parts do not become soft. To obviate this and to protect the parts, Mr. Bush has devised the accompanying utensil, which, after having been subjected to repeated tests, has proven to be quite well adapted.

The little instrument, as shown in the cut, is a kind of sliding tongs, the jaws of which are made of thin springing German silver fastened into a handle. As will be seen, the front part of the jaws



is rounded, cut out annular in the middle, and provided around the edges with small clamps for the purpose of holding upon the interior faces of the jaws two asbestos cushions *A A*. When the instrument is to be used for annealing a pinion or a shaft, the respective wheel or balance is laid between the two cushions, which have a hole in the center, through which the projecting parts of the pinion of balance pass. The article is then pressed firm by drawing on the slide

B, whereby it is retained stationary. The flame is then with the blowpipe directed upon the end to be drilled, and made red hot without heating the wheel or the balance. The effect is so complete that the polish of these parts barely suffers a dimming or loss of color.

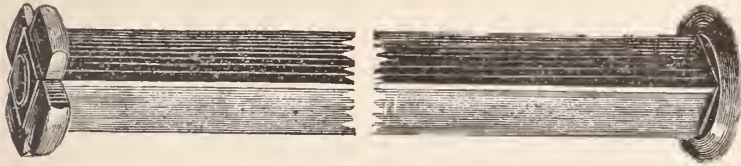
We believe that this handy little instrument will be quite acceptable to the repairer.

Watch Case Stake.



NUMBER of watch repairers, says J. B. Rechsteiner, in a German horological paper, especially those of smaller towns and villages, do not always have a case maker at call to repair battered cases, and they are consequently left to their own resources to do as best as they can. I make bold, therefore, to add the by going representation and description of a case stake which I have used for years, and have permitted numbers of watchmakers to copy it so that it is in extensive use in and around Strassburg, and I now send it to the horological papers either for the acceptance or rejection by the craft at large.

As shown in the cut, its body is square and faced on either end with two differently shaped discs. One of them is in form of a cross,



the four arms of which are of different thicknesses and rounded off on their upper edges. This makes four stakes, each of which can be used for support in the hammering out of the dents either in the rim, bezel, dust cap, central piece, etc., while the other disc is sharp cornered and serves for correcting the case snaps.

The manner of using barely needs elucidation. When the dents are to be taken out of the central part of the case, try first which one of the four arms of the cross fits into the rim; then fasten the stake in the anvil in such a manner that the cross stands sufficiently far away to allow an easy turning of the case. The hammering is done in the usual manner with a mallet.

As stated, the round, sharp-cornered disc serves for improving the case snaps, to be done in a manner similar to that just now described—except that in this instance a very small steel hammer is used. The case rim may also be drawn in as desired. In the case of thin silver or gold cases, the edges must not only above on the edge be driven in, but also a little obliquely toward the interior. First, hammer only very lightly around the whole rim in order to see how it may be drawn in, and increase gradually the strength of the blows until the snap is according to desire. It requires but little practice to do a job successfully.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

A FEW EXTRACTS FROM BUSINESS LETTERS.

A subscriber in Ohio writes: "In renewing my subscription, I wish to assure you that I feel that I could scarcely keep shop without THE CIRCULAR. I work much at the bench myself, and the information I derive from the practical articles I find in its columns are simply invaluable to me. My employees are equally interested

in it, and each month when it arrives it is in great demand, I assure you. I have files of it running back about ten years, and I would not sell them for ten times what they cost me. Sample copies of other papers are often sent me, but while I have THE CIRCULAR I have no use for them."

From an interior town in New York comes this greeting: "I have been pleased with your articles on the labor troubles. This is a manufacturing town, and for a month nearly all the workmen were on strike. Little else was talked about for weeks, and the excitement among the townspeople from day to day was very great, as various rumors were set afloat; but finally the strikers were glad to go to work on the old terms, after having lost thousands of dollars in wages, and most of them ran in debt for their living expenses while they were idle. It was a great blow to business of all kinds, and it will take us a long time to recover our prosperity. I have been in a position to appreciate all you have said on the subject of strikes, and have admired the position you have taken. I enclose two dollars to renew my subscription for THE CIRCULAR, and wish you long life and abundant prosperity."

A Massachusetts correspondent writes: "Will you kindly send me the advance proof sheets of the 'Elsie Bee' Fashion Notes for publication in our local paper. I would be very glad to make arrangements with you to receive them every month. I can assure you that I will use them to the best advantage. Our local paper seems to be lacking anything of the kind. I believe they would be greatly appreciated by everybody. I have been a subscriber to THE CIRCULAR for the last 8 or 10 years and I think that I owe my proficiency in my business more to the reading of that, than to the master under whom I served my apprenticeship. Dr. Bucklin's articles have been very instructive and a great help to me. Wishing you every success in the future, and hoping to hear from you soon, I am, yours very respectfully,
T. J. M."

A Canadian workman sends the following: "I herewith send you two dollars, the subscription price of THE JEWELERS' CIRCULAR. It is taken by my employer, but once in a while I miss getting a look at it and then have a feeling as if I had missed something. I have concluded to become a subscriber rather than miss a single number for the lack of subscribing. Please send and oblige,
T. N. R."

This comes from the Granite State: "I send you to-day \$2.00 (two dollars) for THE CIRCULAR. I think my subscription expired with the March number this year. Am glad you reminded me of it, as I do not wish to be dropped. THE CIRCULAR is too valuable for me to get along without it and should have it if it was \$4.00 per year.
F. P. F."

A voice from Indiana says: "I am out the March number of THE CIRCULAR. Please send the same and credit my account with enclosed draft. I should have remitted some time ago, but neglected. I can not get along without THE CIRCULAR."

An Ohio subscriber writes: "Enclosed we send you our subscription for which please send receipt. THE CIRCULAR is a welcome visitor every month, which would be missed did it not make its appearance.
E. J. S."

Alabama appreciates THE CIRCULAR as follows: "Find enclosed P. O. Note for \$2.00 for which please renew my neglected subscription. I have felt the loss of THE CIRCULAR more than anything else I ever missed. Renew for one year. Send me the June number.
H. M."

A Michigan subscriber says: "Do not stop THE CIRCULAR when my subscription runs out. Just notify me and I will remit the amount. I have just sent six volumes of THE CIRCULAR to the book binders and I don't want to miss any. I could not keep house without it.
W. E. W."

A short extract from an Illinois letter will suffice for this issue: "I enclose two dollars to continue my subscription to THE CIRCULAR, and in doing so I want to express my appreciation of the good

work you are doing for the retail dealers. The correspondence you print is very interesting, and shows the importance of the dealers organizing to resist the encroachments on our business the jobbers are making. They ought to be satisfied with selling goods to us, without trying to steal our trade from us. I look upon THE CIRCULAR as the best paper of its kind in the country, and would not be without it."

A CIRCULAR OF THE OLDEN TIME.

To the Editor of the Jewelers' Circular:

The enclosed curiosity I have shown to the trade as they have called, and at the solicitation of several I send it to you if you desire for publication. The document is 75 or more years old. It was sent to me a short time since by a relative who found it among my grandfather's papers. He used a number of this kind, and these were distributed by him to his customers in the olden time.

Calais, Me.

J. C. BAILEY.

DIRECTIONS FOR THE RIGHT MANAGEMENT OF A WATCH.

As the skilled maker thought that the proper care of those who keep or wear watches would be ineffectual, the following rules seem to be of use and they are arranged for practice :

Let the watch be wound up once in 24 hours, stopping short to preserve the mainspring is an error and may prevent the watch from going 24 hours or cause it to go irregularly.

Move the hands either forward or backward by touching the key by the swivel in the middle dial plate.

Compare the watch once or twice with a good house clock, that is if it does not vary five minutes in a week (for no watch can be warranted to keep more exact time).

Set the hands right by the clock but do not alter the regulating plate. By the neglect of this rule many good watches are doomed, for if a watch gains or loses but a very little in a week, it must necessarily wear out in several months. If it varies more than five minutes in a week (unless an old bad watch) set the hands right and move the regulating plate little or more as the tension requires, not exceeding one or two divisions at a time. This plate to make the watch go well has to be moved forward by the key in the same manner as the hands are set, and backward to make it go slower.

A watch should be wound up every 24 hours if engagements prolong the time of winding it up. In this case the unusual heat of the carrying draft of the spring may make the watch lose, so that if heated by the clock it did not stir the regulating plate. In either case unusual heat or exercise (which has the same or even a contrary effect) observe the same rule with your watch when out of the pocket or over the side hang perpendicular, or let down very carefully, for letting it remain loose in the pocket or the fob, or get a pin and lose the pendant, or, (which is the same thing) let the figure XII go downward, in which case the watch may be hard in setting. Compare the watch with the clock it is set by, and with no other, as too many people do. Don't let a watch go long without cleaning, etc. Money is often lost instead of being saved by these faults of frugality.

Thomas Wagstaff,

Charles Howse,

Morris Tobias & Co.,

Stephen Twycroft,

Watchmakers, London.

Benj. Mead, watchmaker, Casline,

Lufkin & Johnson, watchmakers, Boston. Watchmakers, Boston.

William Bond,

John Macfarlane,

Dan. G. Ingersoll,

And'w C. Trott,

J. & N. Fowell,

Stephen Dutch, Jr.,

This circular is printed on coarse paper which is very much faded and stained, and the printing bears proof of the age of the document, the type being of the old English style with the long s's and other peculiarities.

THE CATALOGUE EVIL.

To the Editor of the Jewelers' Circular:

I entirely agree with your correspondent "J. M. P." in reference

to the importance of catalogues issued by manufacturers and jobbers for the benefit of the retail dealers. I look to these catalogues for information concerning styles and various modes of construction of goods, as to quality and workmanship. I do not care for prices with my catalogues, and think that a price list is an injury, but the catalogues themselves I esteem as of very great value to every retail dealer. I sometimes receive a catalogue with a price list attachment; these I immediately consign to the waste basket and see that they are effectually destroyed, but the catalogue without the price list I carefully preserve for my own use and the information of my customers. I note that they are a decided help to me in making sales in addition to the information that I derive from them. I cannot, however, too severely condemn the practice of sending out price lists promiscuously. The manufacturer or jobber who sends them out is unquestionably making a bid for outside trade and I know of my own knowledge where individuals having no connection with the trade whatever have received them and made use of them. This is a very great evil and should receive the condemnation of every organization in the trade. I cannot conceive what objection the ordinary retail dealer can have to the handsomely illustrated catalogue that shows him the style and character of the goods that are being produced by the manufacturers. I am so glad to receive them that when I see an announcement of a new catalogue to be put out by any responsible firm I immediately send for it to be forwarded to me promptly. I have a good collection of them and find them a great aid in selecting stock. My voice is for plenty of catalogues but down with the price lists.

T. D. S.

Ohio.

MANUFACTURERS, JOBBERS, AND THE OUTSIDE TRADE.

To the Editor of the Jewelers' Circular:

I read with very much interest the correspondence in your columns from month to month and have given especial attention to the various letters on the subject of manufacturers selling to outsiders and direct to the retail trade. Your correspondent "New Blood" writes in a very temperate manner, and I do not doubt but he speaks the sentiments of a good many manufacturers. His idea is to make his goods and sell them as quickly as possible to anybody who chooses to buy. This seems to me a very selfish spirit to manifest, entirely ignoring the general welfare of the trade. It is through such practices as he upholds that the trade has become so greatly demoralized. He ridicules the old traditions of the jewelry business, and the times when the jobber was deemed necessary to the success of both the manufacturer and the retail dealer, and not only seeks to dispense with the services of the jobber, but also to introduce new competitors to the retail dealers, by selling to any outsider who has the money to buy a few goods. The jewelry trade was never so prosperous, never so honorably conducted and never held in such high esteem as it was when the traditions that he so much ridicules were in full force and constituted the rule and practice in the trade. In those days it was an impossibility for manufacturers to reach the retail dealers, scattered as they were, all over the country, and it was a necessity that there should be jobbers at central points to handle the goods of the manufacturers and distribute them through their constituency of dealers, extending over a large territorial area. "New Blood" contends that the modern facilities for travel and communication virtually obviate the necessity for the jobbers, and bring the retail dealers into close union with the manufacturers. It might be that the jobber could be dispensed with, provided his sole occupation was that of distributing the goods of manufacturers, but this is not so; the jobber is as enterprising and pushing in building up a trade for himself as is the manufacturer; he visits either personally or by his travelers, the retail dealers within his territory, imbues them with that spirit of enterprise that characterizes the business man of the larger commercial centers, and by precept and example induces them to reach out for trade.

A very large portion of his expenses is consumed in soliciting

custom from the retail dealers. You may call him a drummer, a commercial traveler, or whatever you please, but the fact remains that it is to this pushing and enterprising middle-man that is due the building up of trade in the interior and on our frontiers. The manufacturers could only reach this trade by employing the same means that the jobber does, his expense for traveling would be the same as the jobber, and, his stock being limited in extent, the expense of marketing his goods would be much greater, and he would find it difficult to combine these two branches successfully. He has all he can attend to, in looking after his factory and his products, and he should be content to leave the marketing of his goods in the hands of that class which makes it a business to do this very thing. I saw a statement in a commercial paper recently that the tendency of trade at the present time was in the direction of bringing the manufacturer and consumer face to face and doing away with the brokers or commission men, or, as they are termed in the jewelry trade, jobbers. I do not believe that this can be successfully carried out; it may succeed in certain lines of goods, although it is doubtful; but I believe that the manufacturer who undertakes to ignore the middle-man will make a failure. In the first place, producers or manufacturers are not ordinarily good business men, knowing very little of the methods of merchants. It is natural that they should be ignorant in this direction for it is seldom that you find a man that is a success in more than one sphere of duty. If he is a good manufacturer he is very apt to be a poor merchant, and if he is a good merchant it is doubtful if he could run a manufacturing enterprise successfully. If your correspondent "New Blood" was more familiar with the practices as they have existed in the jewelry trade for many years, he would appreciate the fact that nothing has tended so much to demoralize the trade as selling to outsiders and ignoring the jobber. Some jobbing houses of the country have more capital invested in their business than many manufacturers; it has cost them fortunes to build up their trade; they have customers on their books who have been there year in and year out for long periods; let them close their doors, as this new light in the trade would have them, and these customers become scattered and the manufacturers would find it a very difficult thing to capture them.

I have on my books to-day the names of retail dealers who I have been supplying for over 20 years, they look to me for the bulk of their stock and depend upon my judgment to a very great extent in the selection of their goods. To build up this clientage has taken time, money and a vast amount of energy. I think a majority of my customers would resent the idea of a manufacturer attempting to deal with them directly and I know that if I found one of them attempting to do it I should throw all my influence against him. I have a right to live as much as the manufacturer has and I propose to do it in a legitimate and honorable manner. "New Blood" has given no argument in favor of his practices that would not apply to the pirate or the guerrilla. His methods are not legitimate, nor can they be excused in circles where the theory of "live and let live" is acted up to or believed in. He does not indicate even what his line is, but from the fact that he deals so largely with the bazaar men, I am inclined to think that his goods are mainly of the "cheap and nasty" variety and probably of the kind that jobbers do not care particularly to handle. You asked in a recent number who made the goods that are hawked about the streets of New York, the cheap scarf pins and collar buttons for a cent apiece and things of that kind; probably "New Blood" could give you definite information on the subject. If this is his style, I for one am perfectly willing that he should seek the outside trade. As a general thing the class of goods that the outside trade handles would be of no credit to the stock of a retail dealer in legitimate jewelry.

There is another point to be made in favor of the jobber, and that is that he is as a rule a most excellent judge of the quality of goods, and I believe does more towards detecting fraud and keeping goods straight than any other element in the trade. Perhaps this is another reason why your correspondent would like to ignore the

jobber. But as most of the jobbers operate from some great commercial center through a large section of country, they are a necessity to the manufacturers of jewelry. They take the large stocks that are made by the manufacturers, becoming personally responsible for them, and distribute them among the retail dealers according to their requirements and upon terms suited to their condition. "New Blood" says that a manufacturer must turn his capital frequently in order to be successful, and I am of the opinion that they would have very great difficulty in doing this year by year but for the cash poured into their treasuries by the jobbers. No manufacturer could live upon the credit basis that the jobbers carry out, unless he had more capital than a person would care to risk in such an enterprise. Where the manufacturer deals with one hundred jobbers and gets his money promptly, he would have to deal with thousands of retail dealers and consult their financial condition as to credits rather than his own. These one hundred jobbers, dividing up the retail credits among them, can afford to carry the retail trade to an extent that an individual manufacturer could not. But if the jobbers are to be robbed of their patronage in consequence of the manufacturers seeking a direct trade with the retail dealers, as advocated by this correspondent, you will see a degree of demoralization in the jewelry trade that has never been equalled. I claim that to-day the jobbers are the back-bone and mainstay of the business. Without them manufacturers could scarcely exist, and the retail dealers would be at a loss to obtain their goods. This seems to me so self-evident that it is folly to discuss it. It has been customary from time immemorial that a middle-man was required to go between the producer and the consumer, and we may be certain that if the manufacturers could have seen their way to do away with the middle-man it would have been done ages ago. Instead of this we find in all lines that the broker or commission class is on the increase, and that commercial travelers, or men who command trade as jobbers do, are in demand. It is to their enterprise that the commerce of this country largely owes its development, and it will take our callow friend "New Blood" but a few years to find out this fact.

Cincinnati.

JOBBER.

To the Editor of the Jewelers' Circular:

I have been a subscriber to your magazine for many years and find it bright and up to the times, and a most valuable and welcome visitor. Recently I have received another "jewelers'" periodical that is regularly sent to me from New York although I have never subscribed for it. In the last number of it I find an item dated New Haven, July 9th, that the plated ware manufacturers have recently formed an association and advanced their prices ten per cent. As none of the trade here have been notified of this action and I see no mention of it in the last CIRCULAR, please inform me if such advance has taken place. Yours,
D. C.
Cincinnati, July 18, 1886.

[The Flat Ware Association was formed over twenty years ago. Hollow ware was added eight years ago. Prices on *hollow ware* were advanced ten per cent. March 5th, '86, notice of which appeared in the *April CIRCULAR*. Flat ware was not advanced and there has been no such advance in July as stated.—ED.]

Why Mainsprings Break.



ANY CAUSES have from time to time been assigned by watchmakers for the breaking of mainsprings. The following are a few in the order of their importance:

1. Winding with a bad key, with too much force or carelessly.
2. Changes of temperature.
3. Projection of the barrel arbor hook beyond the thickness of the spring. This may be the principal cause, contained in the watch

itself, of the breaking of the mainspring, and more especially where no stopwork or other check is used, as in such a case the coils press tighter around the barrel arbor and a projecting hook distorts the steel more. To plainly see the effects caused by such a hook, take a French clock mainspring out of the barrel, put the arbor square through the outside hole and secure the arbor in the vise between copper clamps. Draw the spring away to its full length, and, if it has withstood breakage through softness, projections produced by pressure on the hook will be found along the spring, the highest near the innermost part.

4. Insufficient spring in the barrel; for, if without check, the spring is much more likely to break than otherwise.
5. Bad winding square—too short or too thin for the power of the spring.
6. Bad ratchet, improperly shaped or with missing teeth.
7. Bad click or click spring.
8. Bad spring, imperfectly tempered or badly coiled.
9. Barrel arbor body of too small a diameter.
10. Unreliable stopwork, causing indecision and overwinding.
11. Spring becoming rusty through omission of oil, or through the oil being forced from between the coils out to the edges.
12. Bad barrel hook, or barrel arbor hook, causing an unsafe catch on the spring, and a slip.
13. Careless removal of the spring from the barrel—letting it fly out suddenly.
14. Barrel comparatively too small in diameter and too low, necessitating a thick, narrow and cramped up spring.
15. Removing a spring from a barrel after having been confined in it a long time.
16. Letting the spring down suddenly with a jerk.
17. Poor, sticky oil, which hinders the spring in its development.
18. Star wheel screw touching the coils of the spring.
19. Barrel hook projecting too far.
20. Barrel band out of round.
21. Dropping the watch.

Other causes have been given, but thoughtful consideration will not allow that "a hand rubbing the glass" or the "electricity produced by coil friction" is a valid one.

Something About Pearls Which may be True or Not.

[From *Evening Post*.]



THE PEARL, which has no real relationship with precious stones, is numbered among them in the world of ornament for the sake of its beauty. Formed almost exclusively of lime and an organic matter secreted by its parent mollusca, it has yet, when its dimensions are favorable, and its smooth and beautiful form reflects with an imitable softness the colors of the light, the preciousness of a corindon, which can boast of birth far back in the Azoic age, and a durability that, compared with the fragile and sensitive "gem of the sea," is well nigh eternal.

The pearl, dedicated long ago to Aphrodite, is sacred to love and beauty. A "string of pearls" is the nuptial cord that binds Cupid and Psyche. Its very fragility associates it with the sentiment of tenderness and ideal delicacy; and the subdued brilliancy of its luster was esteemed in the Orient as second only in charm to the "soft splendor" of a young and beautiful woman. A legend attests to this rank of honor for "a perfect pearl." The Talmud records that when Abraham in his journey came to Egypt he brought with him Sarah locked in a chest, anxious to conceal her tempting loveliness. At the place of custom the officer demanded, "Pay custom, for thou carriest clothes." Abraham answered with alacrity, "I will pay for clothes;" and they suspiciously added, "Thou carriest gold." "I will pay for gold," answered Abraham. "Pearls," they said, "thou has brought with thee." "I will pay for pearls," answered

Abraham. And arguing from his readiness that there was something still more precious, the officers ordered the chest to be opened, and there appeared a woman so beautiful that "the whole land of Egypt" was illumined with the vision.

The pearl, which the ancients considered a drop of dew imprisoned in the shell, which early some morning opened to receive its prize, and then held it like a little idol enshrined evermore, is now well known to be a slow and perhaps painful product of the marine animal, which in several families belongs to the order Mollusca, the most important being the "*Avicula Margaritifera*," a species which not only produces the globular or pear-shaped pearl, but the "mother-of-pearl," that has a somewhat similar luster, although different construction; the constituent layers of the pearl being concentric, while those of "mother-of-pearl" are parallel, which prevent the optical effects from being the same. Experiments have been made to determine the time spent in the formation of a pearl, and the result suggests that two or three years are spent to spread a sufficient number of these pearly layers to reach a size of any value.

There is no fixed money value of pearls according to their size, as quality has so important a part in their valuation. A pearl of finest quality is sparkling white, with a delicate reflection of azure; the least tint of yellow spoils it completely, and in securing a necklace of pearls the matching of size and tint gives what is called an "associative value." The bridal gift of the Princess Royal of England, consisting of thirty-two well matched though not perfectly associated pearls, is valued at \$93,000. In 1789 the crown of France held pearls valued at \$86,000, but some of these have caught the deadly ailment of discolorment, which no art has yet found means to prevent or to cure.

The possibility of change in the beauty and value of the pearl is one of the sad perils attending its possession. A moral is pointed against the too jealous hoarding of treasure in the history of a merchant who became the owner of a wonderful pearl of the size of a pigeon's egg, and of an opalescent luster so marvellous that people traveled long distances to be allowed to gaze upon the wonder. The merchant, to express the sanctity of this object, made it the center of something like a temple, whose inner sanctum, paved with malachite, and hung with silken tapestries, contained a pedestal of Egyptian marble on which was placed an intricate casket unlocked by a magical key under the spell of incantations. So guarding his pearl, dearer to him than his life, and representing a fortune, the merchant reached the moment when he wished to display his treasure to the eyes of royalty. A retinue of nobles and a concourse of bankers awaited the spectacle. The mysterious alphabet which regulated the openings of the manifold casket was carefully followed; the unique key was applied to the last guard of the priceless treasure, when lo! almost death-struck with sudden dismay, the merchant found only a mockery of the contents. The imprisoned pearl had lost at once its beauty and its value; it was, indeed, no longer a pearl—the pearl of pearls—but a poor little mass of unattractive limestone, fast darkening to decay.

The most beautiful pearls are found in the Persian Gulf and the Straits of Manaar, which separate Ceylon from India, or more recently in the Gulf of Mexico and upon the coasts of California and the vicinity of Panama. Pain, which is associated with the production of so many precious things that "to take pains" has become the watchword of achievement, is associated with the pearl not only in its birth, but in its presentation to the daylight. The pearl-divers are a short-lived and suffering people.

The love of the ancients for pearls, the extravagance of the Romans in spending fortunes upon them, is well known, and moderns have exhibited equal enthusiasm. Twenty-five years were spent in search for "virgin pearls" to form the necklace (the most perfect pearl necklace now in the world) of the dowager Empress of Russia.

Just at present the "rage" in jewelry is for pearls, and they are set with diamonds, or arranged together in many charming forms. Rosettes and pansies of pearls are linked together with graded strings, or strung like rosaries; ear rings are made in circlets and other Greek forms; a hemisphere of large pearls is one of the caprices as a clasp to the bodice; and two of the reigning beauties of the day wear tongs of diamonds clasping as the "live coal" a radiant pearl.

Foreign Gossip.

EXPOSITION ABANDONED.—The project of holding an exposition at Geneva in 1887 or 1888, has been abandoned; in place of it arrangements are being made to hold a grand Swiss exposition at this city in 1893.

THE FIRST GOLD FROM CALIFORNIA.—In the Smithsonian Institution at Washington is the small nugget of gold, a little larger than a pea, that first met the eyes of James Marshall in the sawmill raceway at Sacramento, and was the beginning of those discoveries in California that have added nearly \$1,500,000,000 in gold to the world's stock of the precious metals.

PROTEST.—French drummers, traveling outside of France, for instance, Germany, Belgium, Switzerland, etc., have sent a petition of protest to the French Department of the Interior stating their grievances, that they are obliged to pay a high tax for pursuing their business in foreign countries, while France is overrun with drummers from all nations who pay no tax whatever.

NEW ELECTRO PLATING FACTORY.—A new factory for silver, nickel and electro-plating has been built at North Attleboro by John P. Bonnett. A steam engine of 25 horse power is used to drive the new and improved machinery which is operated by fifteen hands. In addition to the ordinary plating and coloring jewelry, the establishment is equipped for plating iron and producing a perfect bronze.

AN OPPORTUNITY FOR INVENTORS.—A German firm, Charles Beck, of Ebingen, Würtemberg, proposes, in the *L'Union Horlogerie*, to order 1,000 tricycles, cash down, from any inventor who will send them a model of a tricycle to be propelled either by spring, electricity or weight of rider; any one of our readers who wishes to enter into competition can, by applying to THE JEWELERS' CIRCULAR office, obtain specifications.

GOLD FROM AUSTRALIA.—The production of gold in Victoria, Australia, in 1885, was 735,218 ounces, which was the smallest yield since 1852. The gold production of Victoria appears to be steadily declining, but hopes are expressed that the opening of new mines will add to the yield of alluvial gold this year. The quantity of quartz crushed in the last quarter of 1885 was 213,321 tons, and the average yield per ton was only 9 dwts., 14 grains, or, say, \$9 50 per ton of 2,240 pounds. Nevertheless, the amounts of dividends during the quarter were £144,297, or nearly 20 per cent. of the value of the output.

NEW STYLE OF CLOCKS.—A clockmaker named Leder, of Haynau, has made a remarkable clock. On the figure dial the usual hour and minute numbers are not seen, but in two squares only those figures which show the present time. For example, the figure 3 (hours) and 6 (minutes) are seen. At the expiration of a minute the number 6 disappears from the minute indicator, and seven takes its place, the clock then showing 3:7. The numbers thus change from minute to minute till the sixtieth minute has passed, when the figure 3 changes for 4, and in the minute square appear two cyphers: 00. By this quick way of telling time an error is impossible. The clock keeps most excellent time.

THE TICKING OF THE CLOCK.—Slight though the ticking of a clock may be, its sudden cessation has a wonderful influence upon the inmates of a room in which the timekeeper is located. A dim realization of something wrong steals over senses—a feeling as if something of value had been lost, or a friend had gone away, perhaps never to return, or as if some of the children were sick, until suddenly one looks up and exclaims: "Why, the clock's stopped!" And immediately the ill-defined foreboding dissipates, the little shadow of gloom melts away, and as the winding-up process is completed and the cheery ticking recommences, the family circle regains its wonted buoyancy of spirits, and the members wonder what it was that made them feel so gloomy a few moments ago.

NON-MAGNETISABLE STEEL.—Messrs. Moser, Eadon & Son, of Sheffield, England, manufacture at present a steel alloy containing 15 per cent. of manganese. Both in appearance and tractive power this alloy does not sensibly vary from the ordinary metal, but it possesses one advantage—its indifference to magnetic influence. If thorough tests shall fully establish this quality, we predict that it will be universally employed in watches for engineers, electricians, etc.

DECEPTIVE ADVERTISING.—The laws of the German "paternal" government do not permit misrepresentations in advertisements, and the old fogies who "do not believe in advertising," chuckle over the "protection" afforded them by a code of laws very proper, perhaps, for the fifteenth, but entirely unfitted for the nineteenth century. An advertiser who stated in his handbills and circulars last Christmas that "he sold at cost price," etc., using the ordinary phraseology, had his handbills confiscated by the police, and beside this, he received the warning that at a repetition of the offense, all the terrors of the law "made and provided in such cases" would be invoked against him.

"THE BEST WATCHMAKER."—The story is told of a French watchmaker who, on opening his shop in one of the streets of Paris, "hung out his shingle," on which he modestly advertised himself as "the best watchmaker in Paris." Shortly afterward a competitor established himself in his neighborhood, who, not desiring to hide his light under a bushel, sought to excel the former, and announced himself in gold letters on his sign as "the best watchmaker in the world." "Competition is the life of trade," and so it proved in this instance, because a third watchmaker established soon after between the two, who eclipsed both of them by modestly stating himself to be "the best watchmaker on the street."

THE PRODUCTION OF SILVER.—In the thirty years extending up from 1857, the production of silver in the United States was about \$750,000,000, of which India has absorbed 50 per cent. In that period the production of silver in all quarters of the world was about \$2,185,000,000, so that India alone has absorbed \$59,000,000 more than all the remainder of the world. At the same time, or, at least, in the fifteen years covered by minute statistical records, the purchasing power of silver in India has increased, as it will buy from 15 to 20 per cent. more of the products of Indian labor, or of the labor itself, than in 1870. The demand for silver, therefore, still exceeds the supply in that country. Nor is this surprising. Silver is the great medium of exchange among that people, who in the aggregate are very rich, inhabiting a country of inexhaustible fertility; and yet if all the silver in the outside were added to their present stock, and if it were all used as money, they would have a per capita covering only a third to a half as large as the United States or France. But the principal consumption of silver in India is in works of art or in hoarding.

A REMARKABLE DIAMOND.—In August, 1884, the arrival in London of the celebrated 457 karat fine white diamond from South Africa, and its subsequent purchase by a syndicate of London and Paris diamond merchants, were announced. The gem was intrusted to the care of one of the most skillful cutters, who has been engaged on the stone for the past eight months, and expects to complete the work in April next. As anticipated, the stone will turn out the most wonderful "brilliant cut" diamond on record, surpassing in weight, as also, it is believed, in color, purity and luster, all the crown and historical brilliants of the world. The stone, in its almost finished state, weighs still 230 karats; but in order to give it the best possible shape and luster, it is intended to reduce its weight to something under 200 karats. The Koh-i noor weighs only 106 karats, the Regent of France 136 $\frac{3}{4}$ karats, the Star of the South 125 karats, and the Piggott 82 $\frac{1}{4}$ karats. The Great Mogul weighs 279 karats; it is, however, a lumpy stone, only rose cut, and if cut to a proper shaped brilliant, it would probably not weigh more than 140 karats.

Workshop Notes.

—For giving the final or black finish to lenses use the finest jeweler's rouge on a pitch lap. Vienna lime is used by some for the last finish, in the same manner as the rouge.

TO RECOVER THE GOLD.—In order to recover the gold from contact gilding baths, add hydrochloric acid to the gold solution, evaporate the whole to dryness, treat the residue with nitro-muriatic acid and precipitate the gold with sulphate of iron from the obtained solution. The precipitate, consisting of fine gold powder, is washed and then dried.

GOLD FROM OLD CRUCIBLES.—Some of our correspondents may have old crucibles on hand, and to such we would say, pound the crucibles to a fine powder in an iron mortar, then wash the sand away by taking a little of the powder at a time in the saucer, and dipping the saucer in and out of a pail or vessel of water. The sand will wash away, leaving the gold in the bottom of the saucer.

WHITENING SILVER CASES, ETC.—Pickle for whitening silver watch cases, silver filigree, etc., after soldering is made as follows: One ounce nitric acid, two ounces sulphuric acid, eight ounces rain water. If the article can be boiled in the pickle it is all the better, and is the only way to clean filigree work. Watch cases, spoons, etc., can be heated until quite warm and then immersed in the pickle.

TO CLEAN PINCHBECK TRINKETS.—To clean pinchbeck watch chains, brass plates, dust caps, wheels or other brass parts of a clock or regulator, Mr. Morgossy recommends the use of about one-half deciliter of acetic acid, or strong wine vinegar, mixed with a spoonful of salt, put into a plate or other flat vessel. Immerse the article, let it remain in it for about five minutes, if a chain, long enough to soften the dirt; then take it out and rub it between the hands: keep doing this until thoroughly clean, and it will become bright as when new; then rinse in cold water and dry with a cloth or in sawdust. Dirty wheels or other watch parts can simply be dampened with the mixture and brushed with chalk.

TO REDUCE COIN GOLD TO A LOWER KARAT.—A correspondent asks how to figure in order to reduce coin gold to a lower karat. We presume he means United States coin, which is $21\frac{3}{8}$ karats fine. Multiply these figures by the number of ounces or pennyweights in the coin used, divide by the karat you wish to reduce to, and the difference between the result and the number of ounces or pennyweights of copper to be mixed with your gold. For example, given 100 ounces of coin to reduce to 10 karats fine: Multiply 100 by $21\frac{3}{8}$ and the result is 2,160. This divided by 10, the karat desired, equals 216, which, minus 100, gives 116 ounces of copper or other alloy to be mixed with the 100 ounces of coin.

TO PUT IN A MAINSPRING.—If there is no spring winder on hand, the repairer will have to put in the spring, after it has been hardened and oiled, with his fingers. Holding the barrel with one hand, put the outer coil into it and see that the end is properly hooked and fastened in place, then hold it so with one thumb, while with the other thumb you work in the next half coil; then hold it there, and with the opposite thumb work in another half coil and so on, the opposite thumb working in a half coil at a time till all is in. This is a good way with thin and narrow springs; but when they are wide or very thick or soft, it is liable to twist the spring out of flat, and make the center stand up. When the spring is in, always be sure that the center lies flat in the barrel, that the point does not dig into either head, but stands free between them when on the arbor hook, and see that the hook is sound, well shaped and fits the hole properly; for if the spring slips off when you wind it, it will probably snap and break. In handling the barrel it is, of course, to be held with clean tissue paper to keep the skin from soiling it.

TO CLEAN JEWELRY.—The following process for cleaning jewelry after hard soldering will be found to be fully as good as any: Make a strong solution of cyanide of potassium—say, 10 cents worth to a glass of water—string the articles on a bit of wire and suspend them in the solution, cold, for a few minutes; then, with the usual method of sateenstone and oil, the coating will disappear in one-quarter the time required by any other process. It will always be found handy in removing any oxidations. Remember that the cyanide is a deadly poison.

FLATTENING SCREW HEADS.—To make the head of a long screw flat, get a good screw head tool; the polishing disc, which is a part of it, has two or three segments of metal for grinding and polishing the head flat. While the screw is revolved with one hand, the polishing or grinding disc is oscillated or "wig-wagged" back and forth with the other, so that the abrading material shall not grind circles upon the screw head. On the lathe it is impossible to produce a perfectly flat head without some appliance by which a flat surface can be oscillated across the head in a place that remains constant at right angles to the axis of the screw.

OVERBANKING.—Overbanking depends on the position of the guard pin or point, with reference to the roller table. If the guard pin stands too far from the roller table it will overbank; some watchmakers will advise you to put in a larger roller jewel; but this will not remedy the matter, and it is therefore quite useless. We would suggest that the repairer bend the pin, a pretty sharp bend, close to the lever, and then a little distance from that bend, bend it straight up again so it will stand perpendicularly where it works against the roller table. The guard pin should always stand perpendicularly where it touches the roller table; if it does not, the banking will be different when the watch lies on its back and when it lies on its face, unless the end shape of the lever and balance are exactly the same; even then there is danger of trouble, as the lever may not drop as soon as the balance. Again, the pin is liable to stick or catch against the table when it stands slanting.

GOLD AND SILVER PLATING.—The following is a very simple method for gold and silver plating: Take one ounce of nitrate of silver, which is made as follows: One ounce of fine silver, one ounce nitric acid, one-half ounce of water. Put the silver into a Florence flask, then pour in the acid and water. Place the flask on the sand bath for a few moments, taking care not to apply too much heat, and as soon as chemical action becomes violent, remove the flask to a cooler place and allow the action to go on until it nearly slackens, when, if there is any silver still remaining, the flask may be placed on the bath again until the silver disappears. If the acid employed is weak it may be necessary to add a little more. The red fumes formed, when chemical action is going on, disappear when the acid has done its work. The nitrate of silver formed during the above operation should be poured into a porcelain capsule and heated till a pellicle appears on the surface, when it may be set aside to crystallize. The uncrystallized liquor should be poured from the crystals into another vessel, and heat applied until it has evaporated sufficiently to crystallize. Then you have nitrate of silver. Take one ounce nitrate of silver, dissolve in one quart of distilled rain water. When thoroughly dissolved throw in a few crystals of hyposulphite of soda, which will at first form a brown precipitate, but which becomes re-dissolved if enough hyposulphite has been used. A slight excess of this salt must be added. The solution is now complete. Take a sponge, dip it in the solution and rub it over the work to be plated. A solution of gold may be made in the same way and applied as described. A concentrated solution of either gold or silver may be used for work that has been worn off by applying it with a camel's hair brush and touching it with a strip of zinc. The writer has used this method with the most eminent success. The silver or gold used in making the solution must be perfectly fine.

Trade Gossip.

Mr. A. J. Grinberg arrived home from Europe July 16.

Mr. Isaac Durlach has removed to No. 6 Maiden Lane.

Mr. I. M. Miller, of Miller Bros., sailed for Europe by the *Servia* July 24.

Mr. I. S. Schorsch left for Europe on the *Fulda* July 17, in the interests of I. Emrich.

Mr. R. N. Peterson, of Peterson & Royce, arrived from Europe by the steamer *Aller* June 28.

Mr. L. Oberdorfer, of Henderson, Ky., made us a pleasant call on his return from a pleasure trip to Canada.

Mr. George Merritt, of the Waterbury Watch Company, left for Europe in the *Germanic* July 14 on a business trip.

Mr. Caleb Clapp, of the firm of Clapp & Davies, recently departed for New Mexico, expecting to be gone several weeks.

Mr. Martin H. Miller, who has been in Europe some time in the interests of T. A. Willson & Co., returned early in the month.

Ledos & Marquet is the name of a new firm started in Newark, N. J., and will make stem winding watch crowns and other specialties.

The American Watch Company has opened an office in Cincinnati at No. 55 West Fifth street, which will be under the management of Mr. J. P. Owen.

Mr. S. F. Meyers, of the firm of S. F. Meyers & Co., sailed for Europe on board the steamship *Lessing* July 1, where he will remain for some little time.

Mr. H. Levison, of Levison Bros., of San Francisco, sailed for Europe July 22. His family has been abroad for two years, and he is making his regular visit to them.

Mr. Joseph Steinau, well known to the jewelry trade, died in Cincinnati, early in the month at the advanced age of eighty-seven years. He had resided in that city since 1847.

Clarke, Black & Co., who succeed Nichols, Black & Co., are making a fine line of rolled plate rings and jet lace pins. Eugene A. Warner will represent this firm on the road.

Mr. C. P. Herold, of Philadelphia, has admitted to partnership Mr. F. L. Kirkpatrick, and the business will hereafter be conducted under the firm name of Herold & Kirkpatrick.

Mr. N. J. Felix, manufacturing jeweler, calls attention to his excellent facilities for repairing watches, cases, jewelry, etc. He promises special attention to orders from out of town, by mail or express.

Mr. Geo. M. Baker is now located in business for himself at 119 Mathewson street, Providence, which building he has thoroughly fitted up for the conduct of a general refining and assaying business.

Mr. Frank L. Parke, of Paullina, Iowa, has bought the jewelry stock of Paul & Veeder, druggists, at that place. Mr. Parke reports that trade is good in that locality, and promises to be very active this fall.

Among the recent importations of precious stones by Mulford & Bonnet is an old India pink diamond, heart shaped, which is attracting much attention on account of its rarity. This makes it very valuable.

S. H. Greenberg, for 13 years with S. B. Dinkelspiel & Co., and for the past seven years with Henrichsen & Greenberg, of Portland, Oregon, will commence business as a wholesale dealer in diamonds, watches and jewelry on or about August 15.

A game of baseball was recently played on the Clipper grounds by the employees of Oppenheimer Bros. & Veith and those of S. F. Meyers & Co. The following is the score:

| | | | | | | | | |
|--------------------------------|---|---|---|---|---|---|----|----|
| Oppenheimer Bros. & Veith..... | 2 | 0 | 0 | 0 | 0 | 2 | — | 4 |
| S. F. Meyers & Co..... | 5 | 3 | 5 | 2 | 0 | 3 | *— | 18 |

Mr. Fred. Heffron, formerly with Hamilton & Hamilton, Jr., has made an engagement with H. D. Merritt & Co. to manage their New York office. This firm have acquired an enviable reputation for the character of their rolled plate chain, which is considered by the trade as first-class.

B. & W. B. Smith show in their advertisement this month an illustration of the interior of the store of the Whiting Manufacturing Company. It was fitted up entirely by them, and is not only ornamental in every respect, but is designed to meet the business requirements of the company.

Mr. Louis Kaufman having withdrawn from the firm of Louis Herzog & Co., the remaining partners, Messrs. Louis Herzog and Alfred Frank, will continue the business under the old firm name at the old stand. Mr. Louis Kaufman has established himself in the wholesale jewelry business at No. 14 John street.

Joseph P. Wathier & Co., of Chicago, specially notify such members of the trade as desire to leave their business for a brief vacation during the hot weather, that they are prepared to do their work for them in their absence. Any repairing of whatever nature that they may desire to have done will be promptly attended to.

Mr. Henry C. Haskell, No. 12 John street, manufacturing jeweler, has just issued his badge catalogue, illustrating his many designs for badges and medals. He makes a specialty of making badges for secret societies, athletic clubs, sporting events, etc. His catalogue embraces, apparently, every design that can be conceived of in this line.

Messrs. A. & J. Plaut, of Cincinnati, have laid in a larger stock of carefully selected jewelry for the trade, and are prepared to extend their business in that line to a large extent. They carry also a full line of Howard watches. The firm is enterprising and active, and has secured a strong foothold among dealers in their section of the country.

L. & M. Kahn have disposed of their interest in the stone department of their business to their former partner, M. D. Rothschild, who will continue that branch of the business. The Messrs. Kahn will hereafter give their entire attention to the diamond and watch features of the business heretofore embraced in their general business.

Mr. W. N. Walker, formerly in the diamond business in John street, has taken charge of the diamond department of Messrs. Wheeler, Parsons & Hayes. He has just returned from Europe where he spent several weeks selecting diamonds for the firm. This will be one of the prominent features the firm will present to the trade this fall.

Mr. Jacob Dorst, traveler for Keller & Untermeyer, who has his headquarters in Cincinnati, is the oldest traveler in the trade going out of that city. He has just visited New York on his semi-annual pilgrimage, and returns to Cincinnati loaded down with a fresh supply of seasonable and attractive goods to exhibit to the retail dealers in his balliwick.

The Saturday half-holiday movement has become very general, and has been adopted in many of the leading cities. Cincinnati and Buffalo are among the latest that have fallen into line in this matter. It is a good thing for all parties interested, and will, no doubt, be the rule during the summer season in the future. New York is entitled to the credit of having inaugurated it, and THE JEWELERS' CIRCULAR to having secured its adoption by the trade in this city.

The Hartford Silver Plate Co. claims to have discovered a process for manufacturing a transparent enamel, which they apply to their goods to prevent them from becoming tarnished. All silverware will tarnish to some extent when exposed to the atmosphere, but it is claimed that this enamel will prevent it. The idea is to protect goods in the hands of dealers from tarnishing while carried by them in stock. It can be applied to all articles of silverware.

A new color in mouldings has been introduced for show cases which they call "Black Agate." It is a black background upon which figure lighter colors, giving it a beautiful mottled appearance like very dark variegated marble. Attention is called to the advertisement of Geo. A. Hoffmann in this number, where will be found a full description of this moulding.

A representative of THE CIRCULAR, during a recent visit East, was the recipient of many courtesies at the hands of Mr. Charles Casper, President of the Meriden Silver Plate Company. Gentlemen in the trade visiting Meriden will find him a whole-souled and agreeable entertainer. He is the owner of a fine team of horses which cannot be equaled for beauty and speed by any team in the State.

B. Kahn & Son offer this season, among other novelties in their special line of optical goods, opera glasses of chased solid silver and 16 karat gold bodies at reasonable prices. They are also sole agents of the "Parlor Kaleidoscope," a salable article for every jeweler. They call attention to their catalogue sent gratis upon application, frequently facilitating the sale of instruments which may not be in such general demand as to warrant their being kept in stock.

Mr. C. W. Schumann, of No. 24 John street, has gone to Europe for the purpose of making a visit to his friend, Constanten Makoffsky, the celebrated painter, one of whose paintings has attracted so much attention in Mr. Schumann's store during the past year. The painter has given Mr. Schumann the sole right to handle any pictures he may desire to send to this country in the future. It is expected that he will bring home with him several examples of this famous painter's work.

Mr. Solomon Kampe, of Cincinnati, made an assignment to H. D. Blackburn early in July. The liabilities were estimated at \$8,500 and the assets at \$3,000. His brother, Joseph Kampe, is a preferred creditor to the amount of \$2,000, and C. Benedict for \$500. Mr. Kampe attributes his failure to loss of trade resulting from the floods of last year, the strikes this spring and the prevailing hard times. He hopes to make an arrangement by which he will be able to resume business at an early day.

Messrs. W. Z. Zener, Geo. M. Franklin and C. A. Fondersmith have purchased of Mr. Bitner and his assignee the entire plant of the Keystone Standard Watch Company. The gentlemen named are residents of Lancaster, where the factory is located, and realized the importance of retaining that industry in the place. It is announced that the capital of the company will be at once increased to \$500,000 and the business of watch making pushed with much vigor. The details of the reorganization of the company have not yet been fully determined upon.

Mr. Allen, of the Astor House, recently gave an elegant lunch to a large number of the members of the trade in one of the parlors of the hotel. The table was elegantly set with substantial food, prepared in the most appetizing manner, while beverages of all kinds in unstinted quantities were at command. The symmetry of the tables was soon destroyed, and in half an hour they looked as though they had been swept by a cyclone. Several appropriate speeches were made and duly responded to, and an enjoyable and satisfying hour was spent with the host of this famous hotel.

Attention is called to the new Push and Pull collar button, manufactured by Hodenpyl & Sons. They are made on an entirely new principle, and, it is asserted, have many advantages over the old style, a few of which are as follows: The head being oval, they can be pushed through several thicknesses of linen and pulled out with the greatest ease. The post is flat and turns the oval head across the buttonhole so it is impossible to work out. They are the strongest button made, as there is no strain either top or bottom. There are no springs or movable parts to get out of order or break. They find ready sale, as every one appreciates their advantages at once. They are made in 10-k., 14-k. and 18-k., Roman and polished.

By mutual consent, Mr. Charles E. Juillerat, of the firm of Jacot, Juillerat & Co., retires from the firm. The business will be continued under the firm name of Jacot & Son. This firm has been highly successful during the last three years, and we wish the new firm as much success in the future as it has had in the past. Mr. Jacot, Sr., has published a work on musical box repairing, and is also inventor of the Jacot safety check, showing that he is thoroughly practical in that branch of business.

Mr. S. H. Upson, for many years with Cogswell & Wallis, died April 15. He was a member of the Jewelers' League at the time of his death, his widow being his beneficiary. In a communication to us she desires to make public acknowledgement for the promptness displayed by the League in paying the benefit to which she was entitled, she having received a draft for the money June 7. Mr. Upson had been a member only about two years, having paid about \$100, and the widow received \$5,000.

On the first of July, the Dueber Watch Case Manufacturing Company sent a formal notification to the Board of Trade of Canton, Ohio, that it would locate its factory in that place, and would commence the construction of its works at once. When it became known that the company had determined to remove from Newport, Ky., there was great competition among neighboring towns to secure so important an industry, and some very flattering inducements were held out to the company. Now that the matter is settled in favor of Canton, there will be considerable disappointment in other places that had been sanguine of being selected.

The business men of Canton, Ohio, have agreed to raise \$100,000 for the Dueber Watch Case Manufacturing Company, as an inducement for them to remove their factory from Newport, Ky., to Canton. \$75,000 has already been paid in of the amount, and the remainder is pledged. The employees of the company recently visited Canton, and were delighted with the location, and with the treatment they received at the hands of the citizens. Many of the employees own their own houses in Newport, and these they will dispose of as soon as possible and transfer their allegiance to Canton. The works will be removed as soon as the new factories can be erected, but this will take several months.

The Middletown Plate Company will issue a new catalogue, beautifully illustrated, about the first of September, for the exclusive use of the trade. It will contain cuts of all their new goods, and constitute a valuable book of reference for the trade. We direct attention to their illustrated advertisement of new goods, occupying five pages of this issue of THE CIRCULAR. It will be observed that they are fully alive to the requirements of the times, and prepared to supply the trade with goods new and novel in design and ornamentation and especially attractive. They anticipate a lively demand for goods in the jewelry trade this fall, and have made preparation to do their share towards supplying the goods that will be required.

On Saturday morning, July 24, fire broke out in the large jewelry factory owned by B. S. Freeman & Co., of Attleboro Falls. The fire originated on the top floor, which was occupied by W. G. Clarke & Co., manufacturing jewelers. The wing of the building was occupied by Healy Bros., manufacturers of jewelers' findings; the lower floor by Mason, Draper & Co., manufacturing jewelers, and the ground floor by B. S. Freeman & Co.; W. G. Clarke & Co.'s loss is total, \$30,000, insured for \$9,000; Healy Bros., \$5,000, insured; B. S. Freeman & Co., by water, \$600. Mason, Draper & Co.'s stock was badly damaged by water. They place their loss at \$3,000, insured for \$13,000. The loss on the factory was \$6,000, well insured. About two hundred hands were thrown out of work. All of the burned out firms were running on full time and were driven with orders.

The Plainville Stock Company has recently adopted the plan of marking their lace pins and drops with the initials of the company, "P. S. Co.," which will be soldered to the back of these goods. This company has achieved an enviable reputation for the excellent quality of the rolled plate goods made by it. For the fall trade they have upwards of two hundred new designs and patterns to offer, including a large line of white stone goods. The company has an office at 176 Broadway in this city.

Publicity having indiscreetly been given to the fact that charges had been preferred against Mr. Samuel Swartchild, of Chicago, and that he had been suspended from membership in the National Association of Jobbers, it is due to Mr. Swartchild to state that he has been fully reinstated by a unanimous vote. The charges were fully investigated by the committee, which found that they were entirely groundless. It was a matter of general surprise that a gentleman of Mr. Swartchild's standing should have been subjected to discipline and it will be gratifying to his numerous friends to know that he has been unanimously declared innocent of the charges made against him.

John Boyce, a clerk in the silver and gold refining establishment of Geo. E. Knapp, of Boston, was recently arrested for obtaining goods by false pretences. It is said that Boyce's recent career has been very erratic. Last winter he is reported to have obtained a \$100 diamond ring from Knowlton & Co., of Tremont street, by representing that he had a customer for it. He also secured on a similar pretense \$120 worth of goods from W. R. Schafer & Sons, goldsmiths, and \$140 worth from Kattell & Co., jewelers. Most of these articles he has returned since his arrest. Boyce claims that he is guiltless, but that the goods were sold to him on credit; that he has done such a business with the Schafer firm for a long time, and that they caused his arrest because he did not return on their goods the day they were expected. Mr. Knapp, Boyce's employer, stands by him, and says he is a persecuted man who has tried to do an honest business on a small capital.

As an indication that the jewelry trade is anticipating an active fall business, we desire to call attention to the fact that the present issue of THE CIRCULAR is the largest number ever printed in the month of August. We have had numbers with more pages at other seasons of the year, but never so large an issue for August. This shows not only that trade is beginning to awaken, but that THE CIRCULAR is recognized as the proper medium for manufacturers and jobbers to employ to present to the trade their claims to patronage, and to call attention to the novelties they have prepared for the fall trade. We may add further, that the circulation of THE CIRCULAR is steadily increasing, and never had so voluminous a list of subscribers as at the present time. Our advertising pages this month present a very full directory of the manufacturing and jobbing jewelry trade, and a most excellent idea of what goods can be found in stock.

Early last month a genteel appearing young man entered the store of Clemens Oskamp in Cincinnati, and, explaining that he was about to be married, selected some diamond ear rings and a pin, valued at \$350. He seemed extremely plausible, and finally ordered the goods to be sent to his residence, C. O. D. Mr. Oskamp was a little suspicious, and became more so when he discovered that the house at the address given was unoccupied, but just rented by a stranger. He accordingly engaged the services of a detective to accompany the messenger sent to deliver the goods. The man appeared in response to a ring at the bell, but having seen the detective, he declined to receive the goods, on the plea that he did not expect them until the next day. He was taken into custody, however, and locked up on suspicion. He gave the name of Albert S. Spry, and on his person were found several pawn tickets. He received a lesson that will probably induce him to let the Cincinnati jewelers alone for some time to come.

On the evening of July 2, Mr. Marcus, a diamond merchant of Boston, met at the Tremont House a representative of a New York diamond house, and gems valued at \$50,000 were handed over to the latter. A few days later, Mr. Marcus was notified that fourteen gems, worth \$5,000, a part of the original package, were missing. A search through the hotel availed nothing, and after an interchange of considerable correspondence Mr. Marcus notified the purchaser that he would stand the loss. A few days ago the Rev. Francis Williams, of New York, was visiting Mr. Marcus and was told of the loss. The clergyman remembered that he had seen an advertisement in a Rhode Island newspaper concerning the finding of some diamonds. The advertisement was hunted up and found to be signed "A. S. Jamison, Greenwich, R. I." Detectives were put to work and finally traced the advertisement to the Rev. O. W. Scott, of Greenwich, R. I. The clergyman admitted having the gems, and said that on the night they were lost he was stopping at the Tremont House and found them. He was so dumbfounded that instead of turning them over to the clerk he retained them for three days. Then he was impelled to hand them over to the proper authorities, but feared being charged with their theft. In consequence, feeling that something must be done, he inserted the advertisement but used the name of his nephew, Jamison, who did not at that time reside in Greenwich, simply to avoid publicity and annoyance. Upon learning of the proper ownership, he made every effort to offer speedy restitution, and to that end, accompanied by Judge Tillinghast, of East Greenwich, he visited Boston and returned to Mr. Marcus his lost diamonds. Mr. Marcus was so pleased that he presented Mr. Scott with two gold watches.

The case of Mr. J. N. Mayhew, of Indianapolis, Ind., furnishes an apt illustration of the advantage accruing from the consolidation of claims in the hands of one individual against an insolvent debtor. Some time ago Mr. Mayhew ascertained that his financial condition was so nearly insolvent that he deemed it best to take measures to especially protect his creditors. He therefore issued a first mortgage to the Indiana National Bank for \$2,500 for borrowed money. Then seventeen of his creditors, representing \$6,398, were secured by a second mortgage, and a third mortgage was executed to secure the remainder of his creditors, representing something over \$3,000. The first mortgage was to run sixty days and the second ninety days. When the second mortgage came due, Mr. Copeland, of Martin, Copeland & Co., went to Indianapolis to ascertain what were the chances for the creditors under it. He was somewhat astonished to find that the bank had taken possession under the first mortgage, and that no attempt had been made to satisfy this first mortgage or any portion of it. Mr. Copeland became satisfied that unless prompt and active measures were taken the creditors under the second mortgage would be badly left. He therefore returned to New York and secured from these second mortgage creditors an assignment to him of all their claims. Returning at once to Indianapolis he had a receiver appointed, Mr. John E. Clelland, a well known business man of Indianapolis. The receiver secured the services of Mr. John H. French, the well known auctioneer, who at once proceeded to sell the goods at auction. The stock was invoiced at \$9,492 and the fixtures at \$1,102; out of this there had been sold about \$2,000. Mr. French proceeded to sell the remainder at auction, and, as a result, took in \$8,100, which amount was at once turned over to the receiver. Under this management of the case the first mortgage is paid in full, and the creditors under the second mortgage have already received 75 per cent. of their claims, and will probably realize five per cent. more when the matter is finally closed up. But for the prompt action of Mr. Copeland in this matter, and the assignment to him of all claims, the creditors would probably have realized little or nothing, as the entire assets would have undoubtedly been consumed in closing up the business. Practical men in the trade are convinced from their experience that in cases of this kind it is always best to select some individual as their representative, and to delegate to him power to prosecute their combined claims as though it was one individual claim.

Mr. George T. Bynner, formerly with T. E. Carpenter, will hereafter represent G. H. Leonhardt in the West.

It is well known that a large number of representatives of Eastern houses make their headquarters at the Astor House, where they lie in wait for any buyers that may visit New York. They are an exceedingly lively and active body of commercial men, and when not fully engaged in business, delight in having a good time and playing practical jokes upon each other. One of the most successful of these was perpetrated a short time ago to the chagrin of many of these salesmen and the delight of others who were in the secret. One of their number has rejoiced in a long and flowing full beard, completely covering his features, upon which he devoted much care and attention. Recently, during the warm weather, it occurred to several of his friends that if he would cut off his beard and moustache it would so change his appearance that he would be unrecognizable by even his best friends. The barber shop was visited and the flowing beard immediately sacrificed at the altar of the tonsorial artist. When thus deprived of his bright and shining facial appendage, this young man was so completely changed in his appearance that even his parents would not have recognized him. Then began the fun. He was taken up into the room of one of the party, and word was passed out to the "gang" that a Mr. Shaler was here from Canada for the purpose of making extensive purchases. The salesmen were all agog immediately, and they fairly tumbled over each other in their anxiety to send up their cards to Mr. Shaler. That fictitious gentleman, in the most urbane and courteous manner, consented to receive them one at a time. When they appeared before him, sample cases in hand, not one of the entire number recognized him. He informed each one that he had come to select a large and varied stock of goods, and that he was prepared to pay cash for all his purchases. As their samples were spread out before him, he betrayed such a degree of familiarity with the customs of the trade that at once they set him down as an experienced buyer and solicited his orders with the utmost pertinacity. But Mr. Shaler was not given to do his business precipitately, and announced that he would have no dealing with anyone unless he got the very bottom prices and every discount that could be conceived of by these ingenious salesmen. When, however, his demands were acceded to he gave his orders with the utmost liberality, all goods to be paid for C. O. D. Each one of the salesmen retired from the august presence beaming with smiles of satisfaction, hastening at once to communicate to his house his good fortune and to forward the orders he had received. This style of business went on the better part of the day, during which time Mr. Shaler had placed some thirty or forty different orders among his fellow salesmen, not one of whom "tumbled to the racket." Mr. Shaler and his friends enjoyed the situation hugely, for not only were their companions made to contribute largely to their amusement, but they "gave away" many points in their methods of doing business. Mr. Shaler ascertained that there were certain discounts made to liberal buyers for cash that had previously been unheard of in his experience, and tended to convict of misrepresentation many of those who have been so strenuous in asserting that their practices and prices were uniform with all customers. In some instances the combination of discounts promised Mr. Shaler equalled forty or fifty per cent., but these were such special favors granted to him that he was earnestly entreated not to mention them. The joke was kept up until the perpetrators were tired, and finally, when Mr. Shaler threw off his assumed *nom de guerre* and stood forth in *propria persona*, a more chagrined and disgruntled lot of representative commercial men has seldom been seen. Of course, the joke was too good to keep and soon found its way into the newspapers, whereby the worthy gentlemen who had been so deluded were made the target of many sarcastic witticisms. It is reported that Mr. Shaler and his friends who were in the conspiracy have been smoking persistently ever since at the expense of those who so readily booked the orders of their disguised fellow salesman.

On 14th, 15th and 16th of July, The National Association of Commercial Travelers held their 5th annual convention at the Rossmore Hotel in this city. I. R. Trask, of St. Louis, was elected President, Chas. T. Butts, of Cleveland, and Joseph J. Ball, of Boston, Vice-Presidents, and J. Will. Page, of Syracuse, Secretary and Treasurer. Action was taken on matters of interest to the fraternity, the most important being the James Bill, now pending in Congress, which eliminates all State laws imposing a tax on commercial travelers. "Business before pleasure" was the principle of action in the convention, and after the routine work an invitation was received from the merchants of New York to make an excursion to the Iron Pier at Coney Island and dine. The invitation was accepted unanimously, and a vote of thanks, accompanied with the grip sack cheer, for the merchants' hospitality, and in charge of Mr. Russell P. Hoyt, General Manager of the Traders' and Travelers' Union, the convention embarked on one of the Iron Steamboats for the Iron Pier, where, after partaking of a bounteous repast, three hours were devoted to toasts and speeches. "To The Drummers," Abel Crook, Esq., counsel for the Traders' and Travelers' Union, responded, giving a synopsis of what the organization had already accomplished, and what it purposed doing, reiterating Congressman James' suggestion for the commercial travelers to agitate the matter in every possible way, to buttonhole the Congressman of his district and exact a pledge that he will advocate the passage of the James Bill. Mr. Crook was listened to with the keenest interest from the fact that he drafted the James Bill, and with exception, possibly, of Mr. Russell P. Hoyt, has done more for the benefit of commercial travelers than any other one man in the country. Mr. E. P. Wishuar, General Manager of the Baggage Registry, explained his system, which renders baggage absolutely safe, and is being generally adopted throughout the country. Mr. Frank J. Jones was called upon to respond to "The Press," and in course of his remarks propounded some very pertinent conundrums. We quote: "At Washington \$200 per annum is demanded of commercial travelers. In 1885 over 7,400 visited Washington in pursuance of their vocation, and had the law been rigidly enforced, the result would have been a revenue of fourteen hundred thousand dollars. Less than ten thousand dollars was paid into the Treasury for licenses. Where did the balance go? I have not noticed any of the District Commissioners registered at Montreal. In every instance where a commercial traveler has been arrested in any of the States for a violation of the license law, and he or his employer has had the nerve to test its constitutionality, the Supreme Court of the United States has decided in favor of the traveler, the decision being that the laws interfere with 'Inter-State commerce' and are unconstitutional. Naturally the query arises, why are such laws permitted? Any commercial traveler will answer this conundrum, 'Because I cannot afford the time incident to trial in the courts.' Mr. President, pardon me for egotism in referring to the fact that in the spring of 1861, when my country seemed likely to be reduced to segments, I was one of the first to purchase my own uniform and enlist for three years to support the Constitution and laws, and have never received one dollar bounty or pension. Is it not a parody on equity and justice, and has it not a tendency to dilute my patriotism, that in pursuance of my legitimate business (sixteen years a commercial traveler) it is mandatory upon me to deplete my exchequer to the amount of \$200, to deprive my family and myself of what that amount will purchase for our comfort, and realize that only one per cent. of the amount reaches the Treasury, and that, too, at the capital of my country, after repeated decisions of the highest tribunal in the country that I am not under obligation to comply; but comply I must or I am subject to the espionage of purchasable detectives, walking delegates, who, without warrants, can arrest me, bundle me into a van infested with insect carnivora, hustle me into the pen with bums, haul me before the only police judge in the district, who has, in many instances, stultified himself by giving decisions one day diametrically opposite his own decisions of a few days previous in cases exactly parallel."



THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 189 Broadway, New York.

Advertising rates made known on application.

The Demand for Goods on Memorandum.

THE FALL trade has already set in. The indications are that it is to be an excellent one and that during the next four months there will be an activity displayed in the jewelry trade such as has not been known before in several years. It is comparatively a healthy and vigorous demand that has started, growing out of the wants and conditions of the consumers who find themselves in a financial condition that warrants the gratification of their tastes and the indulgence in luxuries to a considerable extent. The spring trade, which was delayed upon account of strikes, seems to have joined hands with the regular demand of the fall months and promises to make things lively for some time to come. This being the case, indicating a good market for the products of our manufacturers, it would seem to be a very good time to introduce certain needed reforms in the methods of doing business. One of the great evils that has been complained of in the trade for many years, and to which we have made frequent allusions in these columns, is the demand for goods on memorandum. It is alarming the extent to which this has been carried. Retail dealers can form but very little idea of the onerous burden imposed upon jobbers by this demand incessantly made upon them for goods to be sent on memorandum. An individual dealer will send for a few goods on approval and thinks it a hardship if any reluctance is shown in supplying him, but let that dealer multiply his individual requirements in this direction by one hundred or by a thousand and he will get some idea of what jobbers are called upon to provide. The number of retail dealers

in the country is legion, and it is probably not far from the truth to say that nine out of every ten order more or less goods from their jobbers to be sent to them on memorandum. This was a privilege at first cheerfully accorded by the jobbers in order to assist the retail dealers in building up their trade, but what was formerly an act of grace on the part of the jobbers is now demanded as a matter of right by the retail dealers. Indeed, they take it as a great hardship frequently if a jobber seeks to put any limit upon their demand for memorandum goods and threaten to transfer their patronage to some one else if he ventures to remonstrate. The fact that a jobber knows that he must meet this demand for memorandum goods compels him to carry a very much larger stock than he would otherwise be forced to do, thus tying up his capital and straining his credit with the manufacturers to a very serious extent. The worst is that after he has sent out the goods that his customers want he never knows how he stands. His shelves would indicate that his stock was very low and needed replenishing, while as a matter of fact the goods sent out on memorandum may be returned to him at any moment and instead of his shelves being bare, they may be filled to overflowing at very short notice by the return of the goods.

The practice would not be so bad if dealers appreciated the favor that is done them in this respect and strove to make it as little of a burden upon the jobbers as is possible, but instead of doing this they keep the goods for weeks exposed to shop wear and finally return them in a condition that necessitates their being sent to the factory for restoration to their original condition. Often goods are returned by express carelessly packed and left to jostle about in their cases, until when they reach the jobber they are scratched and battered and entirely unsalable until they have been burnished and thus rescued from their demoralized condition. The jobber, too, is left to pay express charges, which forms no insignificant item in his expense account. Dealers at least ought to have the courtesy to pay whatever charges there may be upon the goods thus sent to them as a favor and for their individual benefit.

Frequently a dealer is desirous of making a special display of stock on the occasion of a fair or other event to take place in his neighborhood, which is sure to attract a large number of visitors from out of town. He accordingly sends to the jobbers in various lines of goods for samples of their stock, to be sent on memorandum. With these he is enabled to make a very liberal and enterprising display of goods on the festive occasion for which he provides them. After keeping them until his purposes are served and until after he has been reminded several times that it is expected that he will either return them or pay for them, he finally sends them back. In many cases it is found that they have been seriously injured during their absence from the custody of their owner. Gold cases are scratched, chains are filled with dust and dirt, jewelry broken from the cards, and in various ways the goods are made to show the fact of their unprofitable absence. As a consequence they must be sent to the factory and refinished, the jewelry recarded and various expenses incurred in restoring them to a marketable condition,

Should the jobber intimate to the dealer who has been accommodated by this loan of goods that he ought to pay for these various expenditures, he would take it as an insult. While the jobbing trade does not object to sending out goods on memorandum to a reasonable extent, they do seriously protest against being made a convenience of by the retail dealers. They would like to have it understood that they are willing to aid the dealers in every possible way, even to sending them samples of new goods for inspection, or for exhibition, provided the goods are promptly returned without cost to the jobber, and are not injured during their absence. In no other line of trade does this practice exist to such an extent as in the jewelry trade. A single jobber in New York has out on memorandum nearly all the time goods of very great value; it costs him money to carry them and to keep track of them and this expense is something that should not be put upon him. The person who is accommodated should at least acknowledge the accommodation given him, and certainly not force an expense upon the persons to whom he is under obligations of this nature. The practice is one that has become extremely burdensome and should be done away with entirely, but as this is not likely to occur, and as the jobbers themselves are not particularly anxious to abolish the practice entirely, retail dealers should have some consideration in the matter, and make their requests for memorandum goods as light as possible, assuming for themselves whatever expense may be involved in the transaction. It is one of those abuses that has grown up in the trade of late years, having its origin in the good nature and accommodating spirit that pervades it and should no longer be continued as an irksome burden.

The Jewelers' League.



THE JEWELER'S LEAGUE has now been established long enough for members of the trade to know of its usefulness. Those who have the opportunity to watch its growth and development recognize in it one of the important benefit associations of the day.

It has been extremely fortunate, not only from a business standpoint, but in having secured in its management men of most admirable executive ability, who have devoted their time and energies to the establishment of a beneficial organization for the trade that has no superior in any other industry. Its interests have been carefully and zealously guarded both by the officers and the members, until now it is established upon a basis of permanency that none can question. It proposes to provide life insurance to such members of the jewelry trade as desire to enjoy its benefits. From its first inception it has been encouraged and fostered by the old and reliable firms in the trade who, while not needing its benefits, have given it countenance for the sake of those younger members who stand in need of them. The officers, past and present, have succeeded in securing to it certain moneys which gives it now a liberal reserve fund which is ample provision for any emergency that may arise, of securing the financial solvency of the organization and guaranteeing the fulfillment of its obligations to its members.

While the League is lawfully classed among the fraternal benefit societies, it is practically a life insurance organization. It is conducted upon the assessment plan, which is conceded to be the fairest and most economical plan of life insurance, inasmuch as the expenses are so slight as not to be appreciable to the members, while the benefits paid are derived from assessments levied upon the members only as deaths occur. Thus each member gets his insurance at cost, being called upon to pay no more than is absolutely required for the deaths that occur. Life insurance, or the benefits of an organization like the League, is essential to every man who has not already provided a competency with which to endow his wife and children and others who are dependent upon his exertions for a living; but especially to the men of the trade who are employed upon moderate

salaries is a membership in the League desirable. The cost is comparatively trifling while it guarantees to its beneficiaries in the event of death the liberal sum of \$5,000. But it is this class of salaried men which it is the most difficult to persuade that it is necessary for them to make such provision for their families or other dependents. They do not seem to realize that death is ever likely to call for them. Insurance they concede to be a good thing for others, and they will name perhaps a dozen men who really ought to make provision for their families, but as for themselves, they will argue that they come of long-lived families, and that death is a contingency that seems so far in the dim future that they do not realize that it will ever reach them. If one approaches them on the subject they begin to demonstrate, to their satisfaction at least, that such provision is not necessary for them; that they need their money for other purposes, and that other investments promise larger returns; they will argue that a certain sum of money set apart annually for a given number of years will produce a larger sum than that provided for in the policy. That is all well enough if they were certain of living to realize at the end of the time specified, but as they are not certain of this, and are liable to die at any moment, leaving their families destitute; it is all the more essential to them that they secure the benefits that the League guarantees. There are business men employed in the jewelry trade who are receiving salaries of from \$1,000 to \$5,000 a year; they feel that they are abundantly able to take care of their families and so make no provision for them; they are expecting constantly to receive an advance, to work their way up in the business, and by their own individual accumulations to provide such a competency as will enable them to live comfortably and make adequate provision for their families. But how many of these are stricken down before they accomplish the thing they are seeking? There is scarcely an issue of our journal that does not record the death of some member of the trade who leaves a family unprovided for. A membership in the League would have brought to their dependents a sufficient sum to have ensured them the comforts of life, and to have relieved them of very much of the pecuniary embarrassment that follows the sudden taking off of the bread-winner. No man has a right to presume upon the chances of living, the more so when those chances are going to affect others besides himself. During the time that he is struggling for that advancement that he is ambitious to achieve, a membership in the League will serve to relieve his mind of all apprehension as to the future of his wife and little ones in case of his sudden death. When he realizes his competency and no longer needs the benefits of the League, it is then a simple matter for him to discontinue if he so desires. Every man's life has a value to those who are dependent upon him; he has no right to deprive them of that value, as they will be in the event of his death, when it is such an easy matter to secure it to them. Take the case of a young man who is getting \$1,000 to \$2,000 a year; he has a wife, possibly two or three children, but no other means than his daily earnings. He has educated that wife and children to live in accordance with the salary that he receives, and provides for them all the necessaries and some luxuries of life; he feels confident of his ability to do this and even to increase his income and their comforts; give him health and life and he will probably be able to do so. But he has no immunity from sickness or from sudden death, and if he is stricken down what is to become of those whom it was his delight to provide for? The value of his life has been taken from them, and they not only lose his love and protection, but the pecuniary value of the services that he rendered to them. The League was organized to cover just such cases as these; it is an organization entirely within the trade, none but persons in the jewelry business are admitted to its membership, and to those who fulfil every part of the obligations of the League is guaranteed, in case of death, the sum of \$5,000. It is a provision that any man can make for his family, for the cost is so very small, only a few dollars a year, that the smallest salary paid in the trade will, with economy, enable a man to enjoy these benefits.

The officers of the League are receiving many expressions of gratitude from those who have received its benefits. Some of these have been noticed heretofore in our columns, but one or two cases of recent occurrence will serve to impress upon the minds of others the importance of making this provision for their dependents, at the same time illustrating the good work that the League is doing. We have before us a letter from a gentleman in the clock trade, who acknowledges the receipt of \$5,000 from the League for the widow of a member who had just died. This was a case of peculiar hardship. The member had been connected with the clock trade for over 20 years, was a careful, honest, temperate and thoroughly trustworthy man. He was a member of the League of comparatively recent admission; he had a wife and five children; his earnings were sufficient to enable them to live comfortably, and he and his wife were devoting themselves to the education and rearing of these children to the best of their ability. Some time since one of the daughters was taken sick and a long, lingering illness ensued; during her illness one of the sons met with an accident inflicting serious injuries upon him. The father of these sick ones was taken from his business and for weeks hovered about the bed of his bereaved children. Finally he was taken down with a fatal illness and after suffering a few weeks died. His employers at once notified the League and a check for \$5,000 was forwarded to them immediately for the widow. On the very day of its receipt the daughter died and the son followed a few days later. The mother, so suddenly bereft of husband, daughter and son, had been impoverished by their long illness, and the money sent her from the League was all that intervened between herself and remaining children and dependence upon others. Another letter of recent date notifies the Secretary of the League that one of the members, who was in business for himself in a neighboring State, had been ill for some time and was then an inmate of a lunatic asylum with very little prospect of his recovery. His business had been placed in the hands of a trustee, and all that could be realized from it was consumed by his debts. His membership in the League is all that the bereaved wife has to look forward to in case of the death of her husband, now an event of daily anticipation. In another case of a somewhat earlier date, where the check of the League was handed to a young widow by the former employer of her late husband, that employer says: "We doubt if there are many-cases where the benefits of insurance ever could do more real good and be more appreciated than by them; the husband had been ill for a long time unable to earn a dollar, and was in absolute poverty at the time of his death. The \$5,000, resulting from his membership in the League, will do a world of good to his wife and his two fatherless children." We might turn to the files of the League and cite innumerable instances of a similar nature, but these are sufficient to enforce the point we desire to make, which is that death comes to all men—no man may know the hour of his coming—and those who have taken obligations upon themselves whereby others are made dependent upon their efforts, have no right to refuse to make this reasonable and easy provision for their maintenance which is offered them and so persistently placed before them. The Jewelers' League is a benefit association especially designed for those in the jewelry trade who are dependent upon their salaries to maintain themselves and the dear ones dependent upon them.

The Age of Cheapness.



ISTORY marks certain epochs of time by designating them as the "Stone Age," the "Age of Iron," the "Age of Brass," etc. If we were called upon to designate the present time we should call it the Age of Cheapness. The universal tendency of mankind at the present time seems to be towards cheapness, in almost everything. This tendency, while beneficial in some respects, is in its general

results injurious to all classes. Never before in the history of this country have goods and materials been so cheap as they are at present. Building material, clothing, household goods and furniture, and even jewelry of all kinds can be purchased to-day at far less prices than they could be obtained twenty-five or fifty years ago. The ladies of our households are constantly telling us of the remarkable bargains that they can find in dry goods, dress goods and goods for the household. And it is indeed marvellous at what low rates the necessities of life can now be obtained. But, of course, this cheapening of everything reacts upon the industrial classes and the producers are compelled to accept lower wages in order that the goods they make may be sold at these extremely low figures. When a pair of shoes cost from \$6 to \$8, and were made by hand, the men who made them received adequate compensation for their labor: but to-day we can buy shoes made by machinery for \$3, or even less; as a consequence such men as are employed in the production of these goods must work at very low wages. Machinery, of course, has had very much to do in the cheapening of prices of everything, but hand labor has too often had to compete with machine products and thereby place its productions on a par with those made by machinery. The low rates of wages paid to workmen during the past few years is at the bottom of the recent strikes that afflicted the country and so disorganized our productive industries. Finding themselves unable to support themselves and families in a creditable manner by their labor, workmen organized for self-protection, but instead of seeking to obtain fair remuneration for their services they assumed an aggressive and oppressive policy and demanded more of employers than they were warranted in doing or than could be reasonably granted them. By so doing they have defeated themselves and failed to accomplish their object.

This rage for cheapness pervades the jewelry trade in as marked a degree as it does any other. Competition between manufacturers has been so excessive that the prices of goods have been cut all to pieces and the goods deteriorated in quality as a logical sequence. The jewelry trade is a peculiar one from the fact that the products of its manufacturers are not articles of necessity, but cater to refined and cultivated tastes largely, and are, therefore, to be regarded more in the nature of luxuries. This very fact warrants the trade in exacting a larger margin of profit upon its goods than articles of necessity should be expected to yield. In the latter class "quick sales and small profits" follow naturally, but in the jewelry trade the demand is so fluctuating that no dependence can be placed upon it. As a consequence large values stored upon the shelves of dealers are oftentimes left untouched because some financial disturbance prevents the people from spending their money for luxuries. When this occurs a large portion of these goods become unsalable and must be disposed of at a sacrifice because of their being out of style or out of date or shop worn. As a consequence the goods sold, when there is a demand for them, should be made to pay a sufficient profit to compensate for carrying them in stock for long periods, and for the sacrifice that must be made in disposing of stock that is out of date. Dealers are very apt to lose sight of many little items that go to make up the aggregate of their expenses. They are too apt to hold in view simply the transaction of the moment and to treat with the customer not as one who should be made to bear his fair share of the general expenses of the business but as one who comes to buy a special article, and he always wants that article at the very lowest possible price. The dealer, in his anxiety to make a sale, is too apt to forget that every article he has in stock should bear its portion of the aggregate burden and his profit on each should be a liberal one. When trade is dull dealers are too inclined to think that it is a good thing if they can get even cost for their goods; but this is a great mistake, for if they sacrifice their profit in dull times, it will be all the harder work to retrieve themselves when the demand becomes active and trade remunerative. Unless they set themselves up as beneficent institutions dealers are not warranted in sacrificing at any time their fair and legitimate profits,

But, as we have said, the tendency of the times is towards cheapness, and this leads not only to the cutting of prices but also to the sacrificing of quality. This latter is even more injurious than the former, for while a manufacturer may sacrifice his profits and injure thereby only himself, when he goes to sacrificing quality he inflicts damage upon the entire trade. For the moment that one particular line of goods is cheapened by one manufacturer, his example must be followed by all other manufacturers in that line. Where one will take an inch another will take an ell and so the practice of degrading quality spreads until a point is reached verging upon crime. This degradation of quality involves much misrepresentation, sometimes to an extent that renders the perpetrator liable under the criminal code. It is fortunate for manufacturers outside of the jewelry trade as well as in it, that few persons ever seek redress for wrongs perpetrated upon them of this nature, for if every person should be prosecuted who has sold goods by misrepresentation and thereby obtained money under false pretences, our States prisons would have to be very greatly enlarged. This does not apply to the jewelry trade any more than it does to any other branch of business, for in all lines cheapness seems to be the great desideratum, while quality plays an insignificant part. The medical journals are constantly telling us about the adulterations in what we eat and drink, and the deliterious compounds that are made to do duty for good and wholesome food, until it has got to be a question whether a person can partake of anything without running the risk of being poisoned. Shoddy goods of all kinds are the rule and are the outgrowth of the popular demand for things that are cheap rather than for those of intrinsic value, serviceable and of good price. Manufacturers are often charged with the responsibility for this tendency to degrade quality, but, as a matter of fact, they simply respond to the demand that comes from consumers, for if people will have cheap goods manufacturers must supply them. It seems to be a fact, also, that the cheaper the goods the greater the competition. Manufacturers are continually striving to make their goods a little less costly than are similar goods sold by their rivals in business, but how much further they can go in this direction is something that no one can foresee. So far as the jewelry trade is concerned this practice of substituting the cheap and degraded qualities of goods for the substantial and valuable ones brings it into disrepute, and has a tendency to pull it down from the high rank it formerly maintained as of kin to the fine arts to that of a mere huxtering calling. While the bulk of the goods that are in demand to-day are greatly inferior in quality to the goods formerly sold, there is at the same time a great demand for the finer grade of goods. This comes of the increasing number of persons of refinement, wealth and culture that is constantly being added to our population each year. This class will not be satisfied with goods degraded in quality or with mere imitations; they must have genuine articles or none. The somewhat anomalous condition of things is presented of a growing demand for fine goods that are real works of art, and also an increasing demand for goods of the cheaper varieties. If this latter demand could be curtailed, or if it was not catered to by the trade itself, the demand for a higher grade of goods would be very much larger than it now is and would increase much more rapidly. Instead of educating consumers up to a point of appreciating really valuable and artistic goods, the trade is constantly inciting them to purchase the cheaper varieties and to be satisfied with them. This is successful up to a certain point, beyond which it cannot pass. As an indication of the growing appreciation in this country for fine goods it is a notorious fact that the United States to-day constitutes the best diamond market in the world and that our people are the greatest consumers of diamonds and precious stones of every variety. It is doubtful, too, if there are any other people who indulge so largely in specially made examples of the goldsmiths' art, for no where else does there exist to such an extent the practice of making presentations on the slightest provocation of valuable pieces in gold or silver. Nor is there any other country where athletic sports are fostered more by valuable prizes emanating from the gold and silver-

smiths. These are to be seen in great profusion in the store windows on Broadway and neighboring streets, and in many places where they would be least looked for, but are conspicuously displayed for the gratification of the public and the glorification of some individual or some club. If this taste for works rich in quality and rare in workmanship was encouraged by the trade, it would be greatly to the advantage of our manufacturers and dealers and these would find their profit so much greater in the handling of these specialties than they do in cheap and degraded goods, that the wonder is that more of them do not turn their attention to it. They are, however, simply conforming as a rule to the spirit of the times which demands cheapness, and of course they are not to be blamed for this, for the trade in jewelry and precious stones is but a commercial transaction, and he who devotes himself to it must endeavor to satisfy the demands of his customers. It is greatly to be regretted that the tendency is in this direction, and the only censure that can be applied to the jewelry trade in the matter so far as we can see, is the inclination to cater to the demand for cheapness instead of educating the tastes of the consumers to an appreciation of a higher standard of the jewelers' art.

How Not To Do It.



THE LAST Congress was exceedingly successful in solving the problem that is so often propounded of "how not to do it." It is difficult to find a record of a session of Congress that has been so utterly devoid of practical results as that of 1885-6. There was, of course, a great deal of political discussion, but of actual practical business done there was a great scarcity. There were propositions before Congress that the business men of the country desired to have settled by positive legislation, but time was frittered away in the discussion of unimportant questions, and those affecting trade and commerce and our many industries were left untouched. Among the measures which the trade of the country demanded should be passed was a bankruptcy bill, a bill restoring to circulation the greenbacks of the small denominations, the repeal of the Silver Bill which compels the government to buy and coin into silver dollars \$2,000,000 a month of silver, some amendments to the Tariff Bill and numerous changes in the practices as relates to custom duties. Not one of these measures was passed, nor any other that brings relief or satisfaction to the business men of the country. The comparative barrenness of the last session of Congress was due in part to the fact that the two branches were not in political accord with each other and neither in full accord with the executive. As a consequence, there was constant apprehension between these three branches of government lest one should get some advantage and make political capital out of legislation. The session was not devoid entirely of activity, but much of that activity was barren of results of a practical nature. Much of the time was devoted to the passage of a large number of pension bills of a private nature, which kept the President very busy writing vetoes, and a large amount of time was wasted in the discussion of the President's power of removal and no definite conclusion was reached. Much time was also consumed in consideration of the surplus resolution introduced by Mr. Morrison, abridging the discretion of the Secretary of the Treasury in regulating the surplus. This bill was batted back and forth between the two houses like a shuttlecock, with amendment piled upon amendment, and finally passed in an unsatisfactory form only to fall still-born upon the country through the neglect of the President to attach his signature to it.

Much of the time of every session of Congress is taken up with the investigation of facts in reference to measures of a private nature, a work for the performance of which Congress has provided no adequate machinery. The expenditure of the time thus involved is becoming so great, that a leading member of the House of Repre-

representatives has proposed to provide for a commission for the ascertainment of facts in relation to all private business of a judicial nature to be brought before the House. It might be well, too, if the same tribunal should be empowered to pronounce upon the constitutionality of all measures that are introduced, for Congress has spent a good deal of time in making laws that have been subsequently set aside by the judiciary. One fact seems to be growing more apparent with each session of Congress, and that is that either that body is overloaded with proposed legislation or that it is incapable of properly digesting the measures brought before them and presenting them to either House to be enacted into laws. The result of this is that when measures are brought before Congress they do not seem to be thoroughly understood by members. The report of the committees in regard to them are unsatisfactory, and much time is consumed in the discussion of the bills of the private nature that should be disposed of virtually by the action of the committees. But the great drawback in the way of proper and speedy legislation grows out of the fact that members of Congress have constantly before them uppermost in their minds the one question of political patronage. Upon this hinges the entire legislation of the country; every bill that is submitted, of whatever nature, is looked upon from the standpoint of patronage, and members are wont to ask themselves, "How are my constituents to be benefitted by the adoption or rejection of this bill." If a member sees in a measure proposed any patronage which can be controlled in his interests it is pretty sure of receiving his care and attention; otherwise he is apt to use it as a lever to move other measures in which the patronage question affects him. Until some plan is adopted of depriving members of Congress of either the right or the privilege of controlling official patronage, they will naturally give more attention to that upon which rests their hopes of re-election than to the actual business of the country.

We regard it as especially unfortunate that the bankruptcy bill did not become a law at the last session. With the improved business prospects of the country, it is especially essential that the credit system should be brought under national restrictions to the extent of securing uniformity of dealing with insolvent debtors. It was also unfortunate that something was not done to relieve the country of the great burden of silver dollars that is pressing upon it. There is no demand for this cumbersome currency, and yet the government, under the existing law of Congress, is compelled to go on manufacturing and coining these debased coins, which have a false pretence on their face, and are an incubus to business enterprise. Millions of dollars of silver thus coined into depreciated dollars are stored up in the Treasury vaults and no effort on the part of the government has been able to force them into circulation. The country has been depleted of bills of the smaller denominations in order to thus create a demand for the silver dollar, but business men have no use for them and will not receive them. It is to be hoped that during the recess there will be such discussions of these vital points that Congress at its next session will feel compelled to take them up and give some definite action regarding them. As viewed now, the last session of Congress was abortive, so far as practical results to the business and industrial enterprises of the country are concerned.

Bogus Reports About Bogus Gems.



AN INDICATION of the appreciation in which all kinds of precious stones are held is found in the eagerness with which everything regarding them is read by the public, and constant attempts that are being made to manufacture precious stones artificially, or such close imitations of them as will deceive the public. Some time ago statements were widely printed to the effect that some one had succeeded in artificially producing a genuine

diamond. This was soon exploded, and then came the report that sapphires were being made artificially of such character that they could not be distinguished from those made by nature. This turned out to be an advertisement for some manufacturer of imitation stones, who succeeded in thus creating quite a demand for his colored glass sapphires. The latest sensational announcement of this kind is to the effect that some person in Europe has succeeded in making artificial rubies, and that story has recently been given considerable publicity in this country. An expert in gems, who has recently returned from Europe, was asked about this story, and he replied that it had its origin at the same old source, the manufacturers of imitation gems. The sapphire dodge worked so well that there seems to be a disposition to run the same "racket" through the whole list of precious stones. The artificial rubies are simply the same old pieces of colored glass, with a ruby coloring instead of a sapphire. They may deceive unprofessionals, but no expert could be imposed upon by them for a moment. As a matter of fact, Dame Nature is unique in some of her methods, and will not be counterfeited. She spends ages in forming the precious stones, and they become precious for the very reason that they cannot be successfully imitated. One might as well claim to be able to produce life artificially as to manufacture precious stones possessing those qualities that cause them to be so highly esteemed, and without which they are valueless. The alchemist who seeks to make gold artificially, or to find the fountain of life, has no greater task on hand than has he who attempts to produce precious stones artificially. Imitations may be made, but nothing that can rival Nature's products in brilliancy, luster, and intrinsic value. It is unfortunate that ignorant or unthinking persons give currency to reports as to the production of gems artificially, for there are so many persons who do not know that this is impossible, that the circulation of such sensational stories aids the bogus manufacturers to carry on their schemes for defrauding the public. There is a legitimate trade in and demand for imitation stones, in the manufacture of jewelry, but in the trade these are sold for what they are, and no attempt is made to deceive, or to palm them off as genuine stones. The public, however, is credulous, and those who offer bits of colored glass for precious stones are too often successful.

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THE JEWELERS' CIRCULAR is the *exclusive* official paper of the Jewelers' League, and has been selected for the publication of all matters of interest pertaining thereto. Letters or inquiries pertinent to its business or purposes, and which might interest the trade or inquirers, will herein be answered. Address *Jewelers' League, Box 3,444, P. O., New York*, or the office of THE CIRCULAR.

At the meeting of the Executive Committee held August 6, there were present the Chairman, Geo. R. Howe, President Hayes, and Messrs. Smith, Greason, Lewis, Bardel, Bowden and Sexton.

There were nine (9) changes of beneficiary granted.

On account of the deaths of John T. Connelly, of Chicago, and Wm. Fischer, of Charleston, a double assessment was ordered.

One (1) application was rejected. Four (4) were referred, and the following were admitted at 3 P. M.:

D. L. Auld, Columbus, Ohio; H. E. Hodgson, Norfolk, Va.; Wm. T. May, Jr., Eugene Zieber, Henry A. Weihman, Jr., Philadelphia, Pa.; J. L. Dalgleish, Brooklyn, N. Y.; Frank Davenport, Louisiana, Mo.; Christian Fischer, New Orleans, La.; Chas. S. Walton, San Francisco, Cal.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of July 13, 1886.

- 345,310—Bracelet. G. Lenau, Attleboro, Mass.
 345,292—Clock, Electric. R. E. Fenner, Assignor of one-half to C. K. Giles, Chicago, Ill.
 345,486—Clock, Escapement. A. Dardenne, Marienbourg, Belgium.
 345,589—Watch Dial Wheel. G. E. Hart, Assignor to Waterbury Watch Co., Waterbury, Conn.
 345,335—Watch Escapements. Device for Heading Steady Pins of. G. E. Hunter, Assignor to Elgin National Watch Co., Elgin, Ill.
 345,634—Watch Escapements, Machine for Driving and Cutting Steady Pins for. G. E. Hunter, Assignor to Elgin National Watch Co., Elgin, Ill.
 345,619—Watch, Stem Winding and Setting. C. P. Corliss, Assignor to Elgin National Watch Co., Elgin, Ill.
 345,406—Watch, Universal. L. Beguelin, Tramelean, Bern, Switzerland.
 345,588—Watches, Winding Pinion and Ratchet for. G. E. Hart, Assignor to Waterbury Watch Co., Waterbury, Conn.

Issue of July 20, 1886.

- 345,783—Watch Chain Swivel and Watch Protector, Combined. J. T. Healy, Attleboro, Mass.
 345,815—Watch Movement Holder. C. Teske, Windsor, Conn.
 345,838—Watches, Apparatus for Demagnetizing. C. K. Giles and R. E. Fenner, Chicago, Ill.
 345,800—Watches, Cannon Pinion for. G. C. Moor, Waltham, Mass.
 345,840—Watches, Poising the Hair Springs of. T. Gribi, Elgin, Ill.

Issue of July 27, 1886.

- 346,094—Clock Movement, Electric. S. C. Dickinson, Wilton, Iowa.
 346,201—Watchmaker's Oil Cabinet. E. H. Barger, Hagerstown, Md.
 346,254—Watches, Stem Winding Mechanism for. H. Abbott, Newark, N. J.

Issue of August 3, 1886.

- 346,862—Clock Synchronizing Device. A. Ramel and W. W. Dean, Assignors of one-half to P. Bakewell, St. Louis, Mo.
 346,863—Clocks, Circuit Closer for Primary Electric. A. Ramel and W. W. Dean, Assignors of one-half to P. Bakewell, St. Louis, Mo.
 346,661—Jewelers' Stock. G. H. Knight, Providence, R. I.
 346,812—Watch, Musical. E. N. Gaillard, New York, N. Y.

Issue of August 10, 1886.

- 347,289—Breast Pins, Pin Tongue for. L. Dreyfus, New Orleans, La.

- 347,935—Button, Cuff. G. Meiners, Hoboken, N. J.
 346,970—Clock Pendulums, Electrical Device for Synchronizing. H. Whiting, Cambridge, Mass.
 347,047—Clocks, Music Box Attachment for. C. H. Jacot, Hoboken, N. J.
 347,297—Timepieces, Compensation Balance for. G. E. Hunter, Elgin, Ill., Assignor to Elgin National Watch Company.
 347,271—Watch Balances. G. E. Hunter, Elgin, Ill.
 347,252—Watch Case. C. F. Morrill, Boston, Mass.
 347,139—Watch. G. Thommen, Waldenburg, Germany.
 347,272—Watch Movement. G. Hunter, Elgin, Ill.

Reports and Remarks on a Series of Two Hundred Cataract Extractions.

[BY DR. C. A. BUCKLIN, A.M., M.D., NEW YORK.]



THE FIRST hundred of this series were cases which came under my personal observation while following the teachings of Hutchinson, Bowman, Cooper, Bader and Liebreich, of London, Mooren, of Düsseldorf, Rothmund, of Munich, Arlt, Steliwag, Jaeger and Mauthuer, of Vienna. The second hundred of this series I have operated upon myself.

I think the accidents which occurred in the first hundred cases were quite as instructive to me as my own subsequent personal experience in operating. It is not my object to criticise any one or any method. The whole end aimed at is to demonstrate how accidents happen in cataract extractions and how to avoid such accidents.

Hutchinson, Bowman and Cooper were not innovators in 1877. They did not use antiseptic precautions; they used instruments which were absolutely clean. The patients were all profoundly etherized. The section was never the extreme cut of Graefe. These operators having been taught by experience that a section so near the ciliary body exposes the patient to much greater dangers from cyclitic troubles without giving a corresponding degree of protection from corneal sloughs.

These gentlemen operated much earlier than their continental colleagues. The etherization was profound; the cataract frequently still had a clear cortical layer; the capsulotomy was \perp -shaped and the iridectomy was usually rather small. I never saw but one accident at the time of operation, and my observations embraced fifty extractions. In one case operated upon by Cooper the lens turned a complete summersault before presenting in the wound, which accident I believe always to be the result of slight luxation of the lens with the cystotome. This operation was followed by acute iritis and closure of the pupil. Good vision was, however, obtained subsequently by iridotomy.

The corners of the iris were quite frequently caught in the wound owing to the narrowness of the iridectomy; this fact, taken in connection with the free laceration of the anterior capsule of an unripe cataract, caused iritic processes to be an almost constant complication following the operation; the iritis was, however, mild, and did not, in any instance that I observed, prevent practical vision from being obtained.

I do not think Liebreich's methods ever received the amount of attention that any new operation of apparent practical utility should receive. Neither do I think that his methods would have received the support of many unbiased operators had they received proper consideration. Some of the results I saw from his operations were truly beautiful. One operation resulted in complete slough of the cornea. Another the iris became extensively attached in the corneal wound, and a slow grade of irido-choroidites destroyed the eye.

Liebreich has had very many flattering successes, but, on the other hand, he could never tell when he would have the most dis-

heartening failure from no other cause than the peculiarity of his operation. His case of corneal-sloughing which came under my observation fell into Bader's hands later. He did what I never saw done before intentionally. Although the patient was seventy years of age he made repeated discussions of the lens of the remaining eye, and, after a long time, caused it to absorb sufficiently to give the man practical vision, although a slight portion of the nucleus remained in the center of the pupil. This thoroughly demonstrated to me that it was practical to operate upon cataracts long before they were ripe.

The result of my experience I will give later in detailing my own operations. Modern ophthalmologists dismiss the enquirers of our antiquated colleagues regarding the success of couching the lens in a very short manner, declaring that the operation always leaves a foreign body in the eye, and that this was always fatal to the vision sooner or later. They retort by saying that they have seen some good and permanent results from couching, which statement, for a long time, I doubted.

In a conversation with Dr. Frank Hamilton, he said, when the results of couching at the time of the operation were satisfactory to me, they were usually, after a time, unsatisfactory to the patient. However, when I sometimes completely failed in displacing the cataract from the pupil, the results at a later period became satisfactory to the patient. In the first case, he displaced the lens into the chamber of the vitreous where it was a foreign body; in the second case his couching needle crushed through the lens making an extensive discission. The lens, as in Bader's case, was gradually absorbed; in this way they certainly did obtain satisfactory and permanent visual improvement.

Dr. Agnew, of this city, believes that the methods of Liebreich, owing to the prejudice of the profession against the man, never have received a fair trial, and he is giving them a trial. An operation which commands the respect of an authority so bright and honest as Agnew, must still be regarded with *hopeful* consideration. I think the fact that *he* has not discarded the operation is the most *charitable* thing I can say about it.

While London surgeons had few or no accidents during their cataract extractions, owing to their patients being profoundly under ether, the iritic complications were more numerous and severe than Horner's, Mooren's or Arlt's. The difference could not be traced to any other cause than the stage of development of the cataract, and the extreme delicacy with which they operated. The accidents during the operations were more numerous among the Germans, owing to the fact that they operated without ether or without profound etherization. Every *accident* I ever saw in Germany could be charged to the lack of ether or imperfect etherization, the latter being much worse than the former.

Cocaine is excellent for all operations except enucleation, iridectomy and cataract. I am fully convinced of its dangers in the two latter operations. Most surgeons, however, have to lose an eye for one of their best patients before they can be convinced that if you trust to it you will sooner or later get into trouble.

The German operators learned from experience that the *debris* left behind from attempting to remove a lens which had a clear cortical layers caused severe iritic reactions. They insisted upon removing the iris sufficiently to prevent its corners from becoming entangled in the wound. They tore, more frequently than cut, the anterior capsule. I think an operator in 1877 who would have had the temerity to remove a lens from the eye through which fingers could still be counted at four feet would have found poor support from his colleagues had he been prosecuted for damages.

Arlt, of Vienna, would wait for years till the layer of transparent cortex had become opaque. This was at that time the only way of avoiding the injurious effects from *debris* being left in the eye, thus causing iritic and irido cyclitic complications, and cannot be denied that it was very sound practice. The general introduction of peripheral capsulotomy for all cases of cataract extractions by Dr.

Knapp certainly obviates, to a large extent, the objections to having a small amount of cortex left in the eye.

The experience of Bader had demonstrated to me the amount of lens which would absorb in an old person. Opening the capsule in such a way as to make a perfect pocket of the empty capsule so that the *debris* left in the eye would be prevented from coming in immediate contact with the iris, suggested to me the possibility of operating early.

I have been continually experimenting and now find no trouble in removing cataracts through which fingers can still be counted at four feet, and I am able to obtain a perfectly clear pupil without iritic complications.

Dr. Noyes, in his most excellent text book on diseases of the eye, page 236, states what has always been impressed upon me by most of the authorities I have consulted, namely: "It may be premised that qualitative perception of light, that is, ability to see objects or to count the fingers—not his own, but of another—precludes the idea of operating. I know Dr. Noyes well enough to be sure that he states only what his experience has taught him.

My experience is that out of one hundred cataract extractions ninety-six could count my fingers at from two to four feet. Two cases who could not count fingers were failures from accidents due to a hyper-mature condition of the cataract. I have carefully sought for the reason why experience thus far has brought me to a different conclusion than that arrived at by Dr. Noyes, whose experience certainly has been extensive.

Under "Cystotomy," page 246, I think I find an explanation of how our experiences differ. He passes a cystotome below the lower pupillary margin, making a clean vertical cut to the upper margin of the lens. Now, I have made a horizontal peripheral cystotomy corresponding as nearly as practicable to the upper margin of the lens occasionally owing to an extra large lens or a failure on my part to make the opening large enough. The capsule has torn in such a direction as to make an opening which was vertical and extended below the pupillary margin; in every such case iritis follows, and what should be the movable margin of the iris becomes fastened to the capsule with a vertical capsulotomy. I certainly should expect mild iritis in all cases, and additional iritis in proportion to the amount of clear cortex existing at the time I operated. I believe that every thoughtful ophthalmologist will agree that it is impossible in an eye which has been opened to make an opening in any part of the lens capsule which is covered by iris without having the iris form adhesions to the capsule.

The capsulotomy done by Dr. Noyes is ingenious, easily done and much less likely to be complicated by accidents in hands which are not thoroughly experienced and under perfect control than the peripheral capsulotomy. Dr. Knapp's cystotome, providing it can be maintained in *perfect* condition, so that there is no point which will not cut clean, is a very good instrument. It is so delicate, however, that the difficulties in keeping it in condition are very great. The chances are that three out of five of the most experienced operators who have not used it before or are not warned of the tendency one has to overreach, will plunge the point through the suspensory ligament, which will be followed by vitreous presenting in the wound. A sickle-shaped cystotome with a point flat enough to be easily seen in the eye is more easily kept in perfect order, and is a much safer instrument in most hands than the Knapp cystotome.

The hundred cases which I have operated upon have taught me one lesson. With an empty stomach, profound etherization, a moderately conservative section, absolute cleanliness, an iridectomy sufficiently broad to prevent any possibility of the corners of the iris becoming fast in the wound, a clean peripheral cut in the capsule and the operation will not be complicated by any accident which is within the control of an operator. The eye will close in four days without sufficient reaction for the patient to know from his sensations that the cataract has been removed from his eye; extensive hemorrhage into the vitreous at the time of the operation or soon

after, from the rupture of a diseased blood vessel, is an accident which is not within the control of the operator.

From the two hundred cases of cataract extraction I have seen, not an eye was lost from infection and not a cornea sloughed. If this number of cases had been treated antiseptically it would have been considered as very solid evidence in favor of the antiseptic treatment. I do believe that antiseptic precaution should be taken advantage of in our attempts to avoid infection, and intend to make use of them in the future, although I must acknowledge that my past experience leads me to believe that the only "*bug poison*" necessary is absolute cleanliness. Ninety-four of my cases are of no interest to operators, except as to the condition of the eye previous to operation.

Without incident worthy of mention I obtained a clear pupil for the passage of light to the retina. Ninety-two of these cases could see a lighted candle at twenty to forty feet in a dark room, and could still count my fingers at from two to four feet. Two of them could not count fingers neither could they locate the light of a candle at a greater distance than ten feet. These two cases, however, gained sufficient acuteness of vision to read the daily papers; their distant vision, however, was very defective. The six cases which were complicated are reported in detail.

Case I.—The next case operated upon who could not locate a candle at a greater distance than ten feet, gave an indefinite history of traumatic cataract. I operated without accident; in four days the eye closed and he could not tell from any sensations he experienced that his eye had been operated upon; the vision gained enabled him to tell light from dark objects and to find his way through the doors of the house. An examination with the ophthalmoscope showed plainly the track of a piece of nail which passed entirely through the eye, delicate cyclitic membranes were seen in all directions, although there was no detachment of the retina. Sympathetic disease had already blinded the fellow eye. This case had a better field, and better light perception than the previous two cases. Still the discrepancy in the amount of vision gained teaches us a very practical lesson.

Case II.—Operated upon by a noted and thoroughly competent colleague with severe iritic complications following. I afterwards learned that at the time of operation sympathetic irritation appeared in the fellow eye. At the time I saw him all symptoms had disappeared, and I was requested to operate upon the other eye. The field was good; the operation was performed; it was slightly complicated by his behaving very badly under ether; the iris was wounded in making the section.

The operation was, however, completed without loss of vitreous, and I obtained later a clear pupil. The reaction was much milder after the operation than it was in most of the cases seen on the continent where the final results were favorable. When the pupil cleared up, however, there were delicate cyclitic membranes deep in the vitreous which were the results of previous sympathetic inflammation; the vision, however, was practical, and was better in the second eye than in the first, a circumstance which was, however, purely accidental.

If another operator ever operates on the remaining eye of case No. 1, he will be obliged to record one case where the visual results were not satisfactory. Should his competitor happen to miss two or more such complicated cases, he could present to the world a more charming statistic without being a more expert operator.

Case III.—Old lady 80 years of age, weight 90 pounds, very feeble. No perception of light in left eye; right eye operated upon; cataract hypermature during the evacuation; the lens made a complete revolution, the lower margin presenting at the wound; iritis followed with closure of the pupil; good practical vision was obtained four months later by iridotomy, patient being able to read finest print.

Case IV.—The operation was without accident or complication; never had an operation go smoother. Opened the eye once after

removing speculum and everything appeared perfectly satisfactory; just before applying the bandage I carefully opened the eye to assure myself as to the wound being clear of iris. I found the wound so bulging that the lid could not with ease be made to slip over the flap. The case I regarded as one of severe hemorrhage into the vitreous from the rupture of a diseased retinal vessel.

A few days later I saw a similar case through the kindness of Dr. David Webster. A slow grade of irido cyclitis destroyed the eye in both cases. In both of these cases the operation was without accident, and could not have been done with greater delicacy.

Case V.—An old lady of eighty-five had cataracts that were hypermature. She could not count fingers but had a good field of vision. I removed the cataract without accident. The lens was filled with calcarious *debris*. She could see for some time after the operation, but there was always a deep injection about the ciliary region; the eye looked like one having a small piece of iron lodged in the ciliary body. As months went on the vision was lost by a low grade of cyclitis. I believe that this eye was lost by calcarious *debris* dropping from the lens during its evacuation.

Case VI.—An old gentleman seventy years of age. I operated upon his left eye without accident. Six months later the operation was performed on his right eye. He took ether very badly; after the iridectomy vitreous presented in the wound, the speculum was removed and profound etherization was obtained; without using a speculum a careful cystotomy was made, and the lens was delivered without further loss of vitreous. Moderate iritis followed, but at the end of six months he had $\frac{2}{3}$ in both eyes.

I do not approve of the introduction of a flat spoon into the eye until all other methods of removing the lens fail. I have seen the spoon used frequently where I am positive that had the etherization been carried to the state of complete muscular relaxation, the lens could have been delivered without introducing the spoon into the eye.

Unfortunately, every case (some six in number) where I have personally witnessed the introduction of a spoon, the eye has eventually been lost. It is said to be successful frequently, but those who have introduced large flat spoons into the eye know very well that they feel very uneasy about the prospects of that eye.

Taking into consideration the possibilities of one operator meeting cases of a more complicated nature; of another operator refusing complicated cases, I do not see how the figures regarding the success of one, two or more hundred cataract extractions can demonstrate truly the superiority of any operation or operator.

I would rather draw a conclusion from the nature of the failures, accidents and complications which follow an operator's work than the tabular results of his failures or successes; thus, one operator may be quite clumsy, have loss of vitreous with half of his extractions, entangle the iris in the corners of the wound in the other half of his extractions, and make an irregular tear in the capsule in all of his operations, thus giving quite severe reaction from all of his extractions, and he may still have the luck not to meet a case with diseased retinal vessels which will rupture spontaneously when the eye is opened, or a case of hypermature cataract which has a lens capsule filled with calcarious deposits, or a case of haemorrhagic diathesis which will bleed without end upon the slightest provocation. If it had been my fortune not to have met with these cases I could have reported one hundred operations without a single failure. If it had been my misfortune to meet ten such cases as those I detailed, the judgment certainly would have been that I must be a very bad operator to have so many failures.

My results I sum up as follows: *Ninety-six could read the daily papers.* Two from diseases existing behind the cataract could not read, although the wound healed promptly and there was no reaction. Two were complete failures from causes above detailed, and for which the unbiased scientist can in no way hold operator or operation responsible.

I have not selected my cases, but have operated upon all cases

presenting, irrespective of complications known to exist previous to the operation. The two cases where the light of a candle in a dark room could not be seen at a greater distance than ten feet, but were very uncertain in locating the position of the light, and had been advised against having an operation by very competent authority owing to the probable complicated nature of the cataract. While I acknowledge the soundness of the advice, I cannot help calling attention to the instructiveness of the result, namely, vision sufficiently practical to read the daily papers.

Mineralogical Notes.

[By GEORGE F. KUNZ, New York, N. Y.]

Curious form of Beryl from Auburn, Maine.



IN MY possession is a curious beryl found by Mr. S. C. Hatch at Auburn, Me., of imperfect structure. The crystal is broken diagonally across, thus showing the structure to very good advantage. It is 30 cm. high and 22 wide, and has fifty different layers, twenty-five of beryl, and the remaining twenty-five of albite, quartz and muscovite. All the corners of the hexagonal prism are carried out in full, giving the beryl an asteriated appearance, and making it a striking and interesting specimen.

Capped Garnet from Raymond, Maine.

In this connection the fine essonite and other garnets from Raymond, Maine, may be mentioned. As many as a dozen consecutive layers of garnet and calcite are found in one of these crystals. If the layers are removed, a perfect crystal is found within. One of these, a dodecahedron, 12 cm. by 8, breaking at a calcite layer, forms a very beautiful cap crystal.

Artificially Stained Turquoise from New Mexico.

Numerous parcels of turquoise have recently been sent East from New Mexico, and among them were small lots of exceptionally fine blue color for American turquoise. This color did not appear to be natural, but the stones were found to have the same specific gravity as the others from New Mexico, and cut with the characteristic soapy ivory cut. It was only after the back had been scraped off to some depth that the fact was revealed that they were artificially stained turquoise; the coloring matter employed was the same as used in Germany to make the breccia agate resemble lapis-lazuli, for which the former is often palmed off on tourists. In this case, however, the prussian blue is only a superficial staining and the intensity of the blue is modified by the green. It can be easily removed without injury to the stone by scraping the back with a knife. Prussian blue dissolves readily in (NH₄HO) ammonia, so that the simplest test is obtained by washing the stone in alcohol and wiping it to remove any grease and then laying it in ammonia for a moment. The blue color will partially or wholly disappear, and the gem will resume its natural greenish hue.

If it were desirable to examine the stone without destroying the color, it would be better to cover the face with wax, allowing it to project above the back and then pour a little strong ammonia into this groove. If artificial, the difference of the shades on the two sides would be marked. If stones thus colored were worn in rings their color would very soon be affected by the water used in washing the hands. Ammonia does not affect the color of true Persian turquoise, although washing the hands with them on usually does. By artificial light the color of this stained turquoise is rather gray-blue and appears duller instead of brighter, as is the case with the genuine turquoise. A stone worth 100 to 200 dollars, if found to be stained, would depreciate to only one-hundredth part of its original value. This deception is to be regretted, since it will cast suspicion on any fine turquoise that may be found in this country in the future; the test is so simple, however, that any one can satisfy himself as to authenticity. I would add that a few stones have been cut

from New Mexican turquoise which had, at the time of cutting, a very good blue color, but it changed to the characteristic green within a few days.

Beryls and Garnets from Colorado.

Near Mt. Antero, in the Arkansas Valley, Chaffee Co., Colorado, some very fine blue beryls have been found, resembling in color and general appearance those from Mourne Mt., Ireland. The crystals vary from 25 to 30 mm. in length and 5 to 8 mm. in width, and are quite transparent in some parts. The faces observed were 0, 2-2, 1 of the pyramid and I and i of the prism. Some of the crystals were perfect enough to furnish small deep-blue gems.

Near Salides, Colorado, large quantities of common dodecahedral garnet crystals, coated with chlorite, have been found, somewhat similar to those from the Lake Superior region. These garnets, however, are only superficially altered and the chlorite is of a lighter color. Some hundreds have been found, equaling in size the crystals from Burke Co., N. C., and averaging about one pound in weight. A number weigh over two pounds and a few range from four to eight and one-half pounds.

Alexandrite, Aqua Marine, and Chrysoberyl Cat's-Eye.

A few remarkable gems have been recently purchased by private buyers in the United States. One of these is a chrysoberyl cat's-eye weighing 80 $\frac{3}{4}$ karats, fig. 1. Its dimensions are 23 mm. long, 23

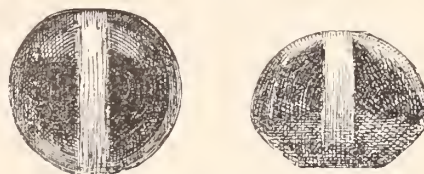


FIG. 1.

mm. wide, and 17 mm. thick. The color, which is very even, is a superb brownish yellow, and the line is as even and distinct as is possible in a gem of such size. The cat's-eye hitherto awarded the palm is part of the "Hope Collection" in the South Kensington Museum. This famous gem measures 35.5 by 35 mm. in its true dimensions, fig. 2. (The Hope catalogue gives the length as two

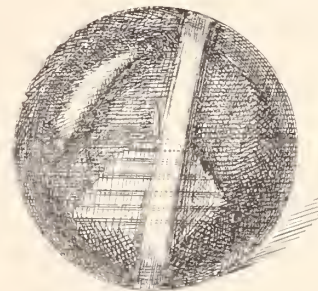


FIG. 2.

inches, but this is only the case when measured over the dome). It formed part of the crown jewels taken from the King of Kandy, in 1815. The crystalline markings are so arranged that the lower half shows an altar surmounted by a torch. The line is not straight, but inclined about 15 degrees. The color is dark and the line is not so strongly marked as it should be in a fine gem.

Two of the largest known Ceylonese Alexandrites are to be noted. One of these weighs 28 $\frac{2}{3}$ karats, and its dimensions are 32 mm. by 16 mm. by 9 mm. In daylight its fine rich green color is tinged with red, but by gaslight it is a rich columbine red, and scarcely to be distinguished from a Siamese purplish-red spinel. The other

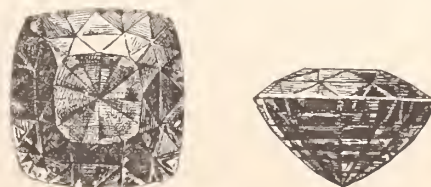


FIG. 3.

stone is the largest on record. It weighs 63 $\frac{3}{8}$ karats, and measures

33 mm. by 32 mm. by 15 mm., fig. 3. It has a yellow, grass-green color by daylight, but changes to a raspberry-red by artificial light.

The finest cut beryl (aqua marine) ever found in the United States is from Stoneham, Maine. It measures 35 mm. by 35 mm. by 20 mm., fig. 4. It is brilliant-cut and weighs $133\frac{3}{4}$ karats. The color is bluish-green, and, with the exception of a few hair-like internal striations, is perfect.

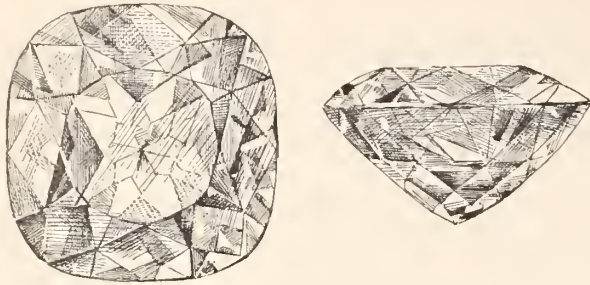


FIG. 4.

A cabochon ruby, from Franklin, Macon Co., N. C., shows somewhat the asteria effect. It is of good normal color and quite free from flaws. Its dimensions are 5.5 mm. by 4 mm., and its weight $1\frac{1}{16}$ karats.

An interesting banded muscovite, from Bear Creek, El Paso Co., Colorado, is composed of twenty alternate layers of brown and white muscovite. The crystal measures 42 mm. in its greatest diameter.

A specimen of quartz, from Arizona, is covered with an alteration of chalcedony and quartz after bent crystals of calcite. The crystals replaced were 12 mm. long by 4 mm. thick; and the alteration is a replacement pseudomorph.

On the Hardness of a Brazilian Diamond.

Messrs. Tiffany & Co. have, during the past year, been conducting another experiment similar to the one described in the *American Journal of Science*, July, 1885, and before the New York Academy of Sciences, June, 1885. In this instance a piece of hard round bort from Brazil was placed in the machine for cutting, the other cutting diamond being a South African crystal weighing $4\frac{1}{2}$ karats. If used for cutting other diamonds, an equal amount of this bort will always be removed by an equal amount of the other diamond; the great resistance in the polishing really occurring when the stone is put on the wheel. This stone was put on the wheel March 10, 1885, and remained on over $7\frac{1}{2}$ hours each day until November, 15, 1885. It was also placed on the wheel another month during February, 1886. The wheel made 2,800 revolutions per minute, and each revolution gave a trifle over 3 feet of traveling surface. The total amount of traveling surface was 170,000 miles, equal to about seven times around the earth. The result of this was the imperfect polishing of one square centimeter of surface. Upon an ordinary diamond at least one hundred times as much effect would have been produced.

Asteriation in Garnet.

M. Babinet examined star garnets, and mentions ("Repertoire d'Optique Moderne") some with four and others with six branches. He says that star garnets with four branches are not rare, he himself having found from twenty to thirty such in from ten to twelve hundred specimens, but that star garnets with six branches are rare, but one of them being found in six thousand specimens. The asteria or star garnets are filled with what he calls filaments or fibers, which cause the asteriated reflections, but he does not state positively what they are. Dr. Isaac Lea ("Proceedings of the Academy of Natural Science," Philadelphia, Feb. 16, 1869,) said that in the examination of a thin fractured piece of a large garnet from North Carolina, he was surprised to find minute acicular crystals which took two or three directions. This induced him to examine more closely into the varieties of garnets which were accessible to him. He also examined 154 specimens of Bohemian polished garnets. He found 48 with acicular crystals, and in the precious garnets from Green Creek, Delaware County, Penn., he found, upon examination of uncut crys-

tals, that nearly 25 per cent. were possessed of acicular crystals. Some 40 specimens of Brazilian pyrope were very free from spots or cavities, and not an acicular specimen was observed in any one. Essonite from near Wheeling, Delaware, and spinel from Ceylon were examined, but no microscopic crystals were observed. From the minuteness of these microscopic crystals in the garnet, Dr. Lea says that it would be very difficult to ascertain what they are, but suggests that they may prove to be rutile (figs. 3, 4, 5, 6, 7, 8 of plate 9, same Proceedings). The figures usually show these crystals arranged in two or three directions, and in fig. 14 two crystals are in part geniculated.

Having examined several hundred carbuncle-shaped Indian garnets, measuring from 12 mm. ($\frac{1}{2}$ inch) to 39 mm. ($1\frac{1}{2}$ inches) in length, the writer found almost the entire lot to be opaque from the immense number of included minerals, especially acicular crystals. Ninety-one crystals in a hundred showed four branches, and nine crystals in a hundred showed six branches. Careful examination in bright sunlight revealed the fact that if the beam of light were allowed to fall near the center of the dome (see Reflection of Window, fig. 5) a four-rayed star was observed, but if the light were allowed to fall upon the garnet from the end (see fig. 6) a six-rayed star, or rather a form resembling two crosses with joined arms, was the result. How-

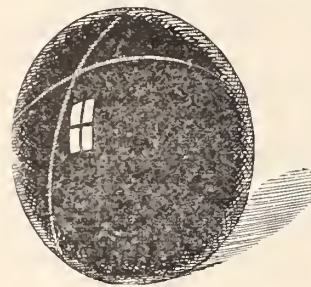


FIG. 5.

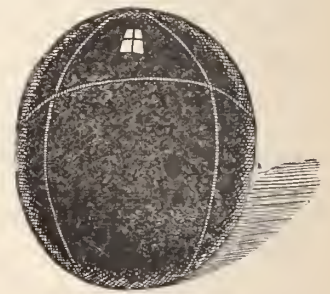


FIG. 6.

ever, if the center of the garnet were shaded so that a strong light came from each end, an eight-rayed star was the result (see fig. 7), showing that the 4, 6 or 8 rays were simply the effect of one or more beams of light condensed by the network of included crystals. The

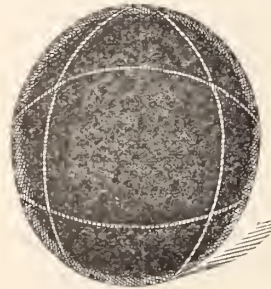


FIG. 7.



FIG. 8.

occurrence of these crystals in this net or lattice-work form (see "Transactions" for Dec., p. 76), and the observation that, especially in North Carolina, rutile frequently occurs in quartz and other materials in this same form, although in larger crystals, together with the occurrence of geniculations in garnets from New Mexico, Arizona and Montana, lead me to the conclusion that these crystals are unmistakably rutile. In each one hundred of the Indian garnets six were as perfect as six-rayed star sapphires (see fig. 8).

A Few Remarks About the Use of Files.

"The file is good for nothing!" How often do we not hear this exclamation, made in anger, about a file which has but recently been taken into use, and when inspecting the offending tool, it will be found full of broken teeth and smooth places, and the angry remark appears to be just and well founded, until we ascertain how the filing operator treated it, and the unprejudiced men will at once see that in nineteen cases out of twenty it was the workman's own fault, if

the file turned out bad in so short a time. Some workmen will, for instance, brace it between the breast and the work-bench, or with the handle in their hand, brace the file against the bench, the article to be filed is laid and pressed upon it and drawn to and fro. The file cut is calculated only for the forward, but not for the backward motion, and this last is the surest way of rendering the file useless in "less than no time," as the operator will apply the equal quantity of pressure, whether forward or backward. Why does he not take the file in his hand? The sharp tail is for the purpose of being driven into a handle, and the handle, as is expressed by its name, is for the purpose of being taken into the hand, but the observing man will nevertheless find many who appear to find a pleasure in using a tool in the most contrary and awkward manner possible. Therefore, take the file nicely in your hand, and when pushing forward, exert the necessary amount of pressure, but when drawing back, almost none whatever.

A new file should invariably be used first for working brass, German silver, etc., as only a new file can be used for these metals. When no longer good for brass, it becomes excellent for filing steel, and at this degree of wear it is useful for a long time. It cannot be avoided sometimes, however, to use a new file for steel, and in such a case it must previously be oiled well, so as to prevent filling up with steel filings. This lodging of the filing-dust is frequently the cause of the breakage of the teeth of new files. It is also easily caused by too firm a pressure, and this should be moderated as much as possible, when using a new file, otherwise the extreme ends of the cuts, which effect the filing, will chip off. These broken glass-hard chips of teeth generally bury themselves in the metal filed, and assist in ruining the tool altogether.

Again, use a file so long upon one side, until this is no longer effective, and then use the other side; by this you have the advantage that you can always count upon one sharp side in cases of emergency. Workmen will frequently use the same file alternately upon steel and brass; this is fundamentally wrong, however, because after it has once been used on steel it is no longer good for brass. If blue hard steel is to be filed, which will occasionally occur, mainly use old worn out files for first filing; you will invariably find some effective places in them—either on the point, or tail end, or sides. Many watchmakers take a pride in always exhibiting a set of new files; this is a proof, however, that they do not understand how to wear them out completely, while others boast of having performed a certain piece of work with worn-out files. To say the least they are no practical workmen, because the little they have saved by not purchasing new files is lost twenty-fold in the extra time consumed in doing the job. A good workman will not only have good, but he will also have worn-out files—a sign that he understands how to use them.

It is a serious error to leave the file packed full of filing-dust. The cuts can easily be broken out by this lodging, without considering that this dust will produce deep scratches upon the article filed. If the file-brush is unable to take it out, use the sharp edge of a piece of brass (wire, etc.,) but never steel, to press the dust out in the direction of the cuts. Places treated in this manner will invariably fill up again, unless a little oil is applied in the grooves, to be repeated from time to time. If a file-tooth has become lodged in the piece of work being operated on, it is to be dug out either with a small chisel or the point of a graver.

When packed into the tool drawer, it is customary to pile the files closely on top of each other. But this will produce, in the opening and shutting of the drawer, and still more so in the searching for something, a rubbing between them, which causes them to wear out quickly. No greater number of files than can conveniently be placed side by side should be laid into one drawer, and should this not be possible for some reason or other, lay the files for steel contrary, in such a manner that their points rest upon the handles of those for

brass. This has another advantage—the workman can at once place his hand on the kind he desires.

Many workmen have the custom of wiping the file during use with the flat of their hands; this is very pernicious, because only a clean file will take hold well, while a greasy one will not, and the fatty layer must first wear off at the expense of the file.

A worn-out file can often be restored, and the following process has stood the test of experience.

1. Clean the file with potash or soda, dissolved in water—if fatty or resinous particles are to be removed; if rusted, use hydrochloric acid, and by rubbing with a metallic brush or a piece of coal if particles of iron, brass, lead, copper or tin are to be gotten out. The file is next dipped in a mixture of 1 part nitric acid, 3 parts sulphuric acid, and 7 parts water. As the operation of the acids becomes weaker, which is caused by their combining with the iron, the temperature of the bath is to be raised, because rapidity is one of the conditions of success. The time during which the file is to be exposed in the bath varies from 10 to 100, and more, seconds, since the sharpening of fine cuts is more rapid than with a rougher. After having withdrawn them from the bath, dip them into lime water, dry, and then cover them, by using a brush, with a mixture of oil and turpentine, after which they are ready for use.

2. When the file has been cleaned in the above specified manner, it is entered into a basin with water, in which it rests upon two wires, so that its entire surface is exposed to the fluid. Then pour in strong nitric acid, in the proportion of 1 part to 8 parts water, mix intimately, and leave the file for 25 minutes in the bath. Then take it out, and after having washed it in water, and rubbed it with a hard brush, re-enter it into the bath, to which a second one-eighth of nitric acid has been added, and leave it exposed for 50 minutes. Again take it out and brush it, add to the bath one-sixteenth of concentrated sulphuric acid, and re-enter the file. Then withdraw and wash it first in clean and next in lime water (in order to neutralize the last traces of acid), and dry. You will find that the tool is like a new one both in quality and appearance.

These methods are vastly superior to recutting, as by this manipulation the steel suffers severely, in consequence of which the files will afterward last only for a short time, while by employing the chemical process, they are fully as good as new.

The manner of fastening in the handle is often faulty, and the following is a good method of doing it.

Take an old, worn-out file or a piece of iron of the same shape as the fastening part of the file, heat it several times to red heat, and when thus heated, drive it into the handle, paying attention to hold it vertical. In this manner a hole of the corresponding shape is formed in which the file is retained, without the necessity of employing extra force for fastening it.

Only one circumstance operates against this manner of doing it. It is not possible at all times to find an old file with a tail-end of the shape similar to the new, and in this case the following method may be employed: The end is driven into the cylindrical hole of the handle, so that this becomes conical, and the end enters for one-half its length, and fits on all sides. Next, a few slight taps with the hammer suffice to fasten the file, which need not enter so deeply into the handle. For this purpose (with the file in the handle) take the handle free into the hand, and strike with the hammer on the lower end. It is not enough that the file sits firmly in the handle, it must also sit perfectly parallel in it. How difficult it is to do a straight job with a file, the point of which inclines forward or backward, is perhaps too well known to the readers to require elucidation.

But these are only trifles, methinks some will exclaim. Of course they are trifles; epochs of thousands of years passed by as trifles—in the fractional parts of seconds. By attending to above directions, the workman will be enabled to keep this indispensable tool useful for a longer time.—[G., in *Deutsche Uhrmacher Ztg.*]

On Repairing and Examining Watches.



LXPEDITION and certainty in watchmaking, says the distinguished horologist, **CLAUDIUS SAUNIER**, are primarily secured by proceeding on a definite system both in the preliminary examination of the watch and in details of constructing and repairing. The best watchmakers, and practical men generally, take their work in certain order, from which any departure is exceptional. By this means they avoid the necessity of doing work twice over, and of frequently taking up the same piece, a circumstance that often occurs with young watchmakers, owing to forgetfulness, or to a want of sequence in their ideas. They should from the first exercise themselves in working methodically on a definite system. It must not, however, be understood that no method can be inflexible, nor can it be equally advantageous for different individuals, because men differ in regard to manual dexterity, goodness of eyesight and of memory, power of associating their ideas, etc. A system that is suitable to a person of unexcitable temperament will have to be modified by one who is oppositely disposed. Everyone will be able to decide for himself as to the best system to adopt, and the order in which to perform his daily work.

These preliminary observations appear necessary because the method explained below of examining a Swiss watch has been regarded by some as too long and minute. We would urge any young watchmaker who hears such an idea advanced to assure himself that it is a mistake, because the system here explained is only put forward subject to the modifications that experience suggests; and it is to be observed that many of the operations given can be performed more rapidly than they are described.

When a watchmaker experiences a great loss of time, does it not usually arise from the fact that he is obliged to take a watch to pieces, or nearly so, after its repairing and examination were thought to have been completed; or when a watch that has been repaired is brought back to be examined before the ordinary period of cleaning has elapsed? Let him add together the numerous hours spent in this kind of thankless work, let him sum up the worries experienced, and the discredit, etc., to which he has been subjected, and he will see that systematic work would have saved him both loss of money and loss of credit.

EXTERNAL EXAMINATION OF THE WATCH.

In the following paragraphs, when the manner in which a given fault is not indicated at once, explanations will subsequently be given.

Case, Glass, Dial, Dome.—Glance at the case in order to ascertain that it has not received a blow or been subjected to pressure; that the joints and fly springs work well; and that the hands in rotating touch neither the glass nor dial. By laying the nail on the surface of the glass, it will be easy to see whether there is sufficient freedom between the socket of the hand and the glass. In case of doubt, place a small piece of paper on the hand, close to the bezel, and tap the glass with the finger while the watch is in an inclined position. If free, the paper will be displaced.

The set-hands square should be rounded at the end and a trifle below the level of the dome, in order to avoid the possibility of contact, in case of any accidental bending of the back of the watch, and the dome must not press on the balance cock wing or the central dust-cap (if present). The above remark also applies to the winding square of a fusee watch.

There must be sufficient freedom between the going-barrel teeth and the banking-pin of the balance on the one hand, and the internal rim of the case, the fly-springs, and the joints on the other. Otherwise there is danger of contacts when the case is closed, which occasions irregularity and stoppage often difficult to detect.

The dome must be at a sufficient distance from all parts of the movement, more especially the balance-cock. If there is any occasion for doubt on this point, put a thin layer of rouge on the parts

that are most prominent. Close the case, and, holding it in one hand to the ear, apply a pressure at all parts of the back with a finger of the other hand, listening attentively in order to ascertain whether the vibrations are interfered with. If the interval is insufficient, a trace of rouge will be found on the inside of the dome. In such a case, if the dome cannot be raised or hollowed slightly in the mandril (when made of metal), lower as far as possible the index work and the balance-cock wing and fix in the plate, close to the balance, one or two screws with mushroom heads that will serve to raise the dome.

Ascertain that the hands stand sufficiently far apart, that the hour hand does not rub against the hole in the dial; and that the minute hand does not come nearer to the dial in one place than another, a fault which may arise either from the dial not being flat or from the center wheel being badly planted.

Remove the movement from its case, after making sure that it is held steadily by the locking screw; take off the hands, and see that the hour wheel has the right amount of shake; this freedom may be diminished, if required, by laying on the wheel small discs of tinsel cut out with a punch. If the dial presses against any part of the movement, or is not flat, or comes so near to any of the pivot holes as to draw off the oil, it must be ground away until a sufficient amount of freedom is obtained.

TO EXAMINE A SWISS MOVEMENT.

Although the following remarks refer in the main to foreign watches with Lepine movement, very many are also applicable to the English watch; further observations specially bearing on it will be found in paragraphs in the course of this article.

The Motion Work and Hands.—Rotate the wheels connecting the hour and minute hands by aid of a key, and a glance will suffice to show whether the several depths, which should be light, are satisfactory. The wheels should not rub against one another, the plate, barrel, or stopwork. The barrel should have been previously examined to ascertain that it is not inclined to one side, as, if it were, an error would probably be made in estimating the degree of freedom.

The set-hands arbor (the square of which should be a trifle smaller than that of the barrel arbor) must turn rather stiffly in the center pinion, and the cannon pinion must be held on the arbor sufficiently tight to avoid all changes of its rising and so becoming loose; for this would alter the shake of the hands and motion work. If any fault is found in the adjustment correct it at once, so as to avoid doing so after the movement has been cleaned.

If it has not been already done, slightly round the lower end of the cannon pinion and the steel shield, care being taken to avoid forming a burr on the pinion leaves. These two pieces ought to rest on the ends of the center pinion pivots, and at the same time be some distance removed from the plate and bar respectively.

Freedom and End Shake.—Observe that there is sufficient clearance between the plate and barrel; the barrel and center wheel; the several wheels in succession, both between themselves, their cocks, and sinks; between the balance on the one hand, and its cock, the center wheel, fourth wheel cock, the balance spring coils and stud on the other. The fourth wheel is frequently found to pass too near to the jewel forming the lower pivot hole of the escape wheel.

The end shake of the wheels may be tested by taking hold of an arm of each with tweezers and lifting it. This may also be done in the case of the escape wheel, but, when the cock is slight, it will be sufficient to press gently upon it with a pegwood stick, then releasing it, and observing the apparent increase in the length of pivot. At the same time ascertain that the width and height of passage in the cock is enough to allow the teeth, when carrying oil, to pass with the requisite freedom.

Holding the watch on a level with the eye, lightly raise the balance with a pegwood point several times, each time allowing it to fall. The variation observed in the space between the collet and cock will indicate the end shake of the balance staff.

Action of the Escapement.—The side play of the balance pivots in their holes can, with practice, be easily estimated by touch, or this may be done by the eye, attentively watching the upper pivot through the end stone with a powerful glass, while the watch lies flat, and the lower pivot in the same manner with the watch inverted. If the end stones are not clear enough, although such a case is rare, remove first one end stone and examine the pivot; then replace it and remove the other.

(To be Continued.)

Celebrated Horologists.



DEATH is rapidly thinning the ranks of our most eminent horologists; they are being garnered one by one, and on January 29, 1886, another one, the celebrated Joseph Thaddeus Winnerl, was interred in the churchyard of the small village Andrézy, near Paris, in the presence of several high officials of the French Department of Marine and a number of friends and colleagues. He was a Frenchman by adoption, having been born at Mureg, in Styria, Jan. 25th, 1799, and after having visited and worked in nearly all the large centers of the watch industry of Europe, he went to Paris, in 1829, where he worked for the most celebrated artists of that day, among others for Bréguet. Becoming enamored with Paris, he resolved to remain there, and applied for naturalization as a French citizen, which request was readily granted him in 1840.

In 1844, Winnerl was made a knight of the legion of honor, and in 1855 he was promoted to be one of its officers. His ambition also led him to court political honors, and he became a member of the city council of Paris, in 1859, which position he retained until 1870. As watchmaker, his great fame was earned in the construction of marine chronometers, of which he made a great number, of excellent workmanship. Several of them received a premium at the time when the period of testing was thirteen months.

In 1844, the Société d'encouragement published illustrations and descriptions of his pendulum clocks and seconds counters. His researches on the isochronism of the pendulum oscillations, as conditioned by the thickness of the suspension spring, are doubtless the best of the kind.

In January, 1868, Winnerl constructed the first clock with electric contact, which is still in activity in the basement of the observatory. He employed Thos. Reid's escapement, which he altered and adapted in so skillful a manner that it complied with all the requirements.

Before Winnerl went to France, he worked for Kessels, and afterward for Jürgensen. Two weeks after his entrance into the latter's shop, Jürgensen came to him with a sober, serious face, and said: "You have deceived me!" Winnerl jumped up in surprise. "Yes, sir; you have deceived me!" Jürgensen repeated; "I promised you a situation, in case you should prove yourself to be a skillful workman, and you caused me to believe at the time that you would comply with my requirements; but in the two weeks that you have worked for me, you have turned out more artistic and better work than any other of my workmen; from to-day on you enter into my own shop."

In Paris, a brother watchmaker described to Winnerl the idea for a possible invention, asking the latter's assistance to execute it in metal. Winnerl studied it out during the night, and next morning he handed to his employer the solution of the problem in steel and brass. The watchmaker invited him to dinner, and Winnerl found in the folds of the napkin three bank-notes of 1,000 francs each, by the help of which he was enabled to start his own shop.

It is worthy of mention that Winnerl regulated his chronometers, even the last one he constructed, according to the requirements of

the French marine, and he suffered no mediocre production of any description to leave his shops.

He very materially assisted with his mechanical skill in the profound calculations of Francis Arago, and Humboldt, Thénard and Dumas employed him whenever opportunity offered.

At the grave, Claudius Saunier made a few remarks in the name of the French watchmakers, and lauded the eminent services and generous disposition of the deceased. A large gap is opening in the ranks of our watchmakers of celebrity, and Claudius Saunier is one likely to follow soon.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number Three.

Continued from page 221.



THE READER will be interested to know something more of those who were employed by the company at that time, and the methods they pursued. As has been already said, James L. Baker, the third employee, was the escapement maker. The pallets, like all the other steel parts, were punched out, and a number of them put into a hardened steel gig and filed up together by hand, as they had no milling tools at that time. The finishing touches were done by a set of gang files run by power. Mr. Baker also made the screws. He enjoys the distinction of having worked on the first sewing machines manufactured in America, as well as on these watches. The plate and train departments were under the immediate charge of the Marsh brothers, but all, of course, under the general superintendence of Mr. Dennison. Mr. John Lynch, the present foreman of the jewelers department of the American Waltham Watch Company, came from New York to do the jewelers in May, 1852. Mr. Buckley also came with him at the same time. The manner in which the jewelers was done then and now is vastly different. The bottom plates were cemented up and the settings cut for the jewels by hand. The jewels were generally set flush with the upper side of the plate, then the train and escapement were put in, the top plate laid on, having, of course, first drilled the holes through the top plates where the jewels were to be set. Mr. Lynch would then sight through on the under side of the top plate, and, in order to arrange the end shake, he had slips of paper for each movement, and, by means of a few hieroglyphics which he used, he would indicate the location for the jewels in the top plate. His signs were as follows:

- Jewel to be set considerably above the lower side of the top plate.
- Jewel to be set a little above the lower side of the top plate.
- ✕ Jewel to be set flush with lower side of top of plate.
- Jewel to be set a little below lower side of top of plate.

When the shoulder was above the lower side of the plate, as the first two signs indicate, he would raise the top plate a little on one side until he could see the shoulder, and then measure the distance on the pillar. This seems a very primitive method indeed as compared with the automatic jewel setting and end shaking tools of to-day; but from long experience the jewelers of that period became very expert. The jewels were all set in the plate, no jewels in settings being used until some time later. At the time Mr. Lynch went to Roxbury, Mr. Sibley was making a few aqua marine jewels for the company, but these were soon abandoned and imported jewels used entirely, until after the removal of the company to Waltham.

About this time the company suffered considerable inconvenience with their pallet jewels, by reason of the grinding causing the disease known as "black vomit." They soon found the difficulty to be in the grinding of the stones, which they had heretofore ground from top to bottom, and they, not being highly polished, cut the face of the escape teeth. This was remedied by grinding the stones from heel to toe, and afterwards they had no further trouble.

The first balances were of steel, but gold was soon after used. They were both made by Mr. Brown, an English balance maker, whom the company engaged from England to come to America to take charge of this work. The first dials were made by John Todd, a Scotch dial maker, but his dials proved unsatisfactory, as they would very often crack at the feet. They next engaged Mr. John T. Gold, then but a mere youth, who had learned, partly at least, the trade from his father, who was then making dials in New York city. He was not able, however, to make dials that were satisfactory, and they concluded to send him to Liverpool, in 1853, at their own expense, to learn, if possible, this trade. He remained there ten months and was able to make the dials for the company after he returned. He also brought with him two recipes for making enamel, which Mr. Howard immediately set about experimenting with. He was, however, unable to make an enamel that the acid would not touch, which it was necessary to use in order to cut out the seconds bits. Mr. Howard, however, continued to experiment untiringly, until finally he was able to make an enamel that was fairly satisfactory. Even after Tracy, Baker & Co. became owners of the plant, in 1857, it was remarked that the banks of the river near the factory in Waltham had the appearance of a china shop, as so much enamel had been thrown out as refuse. The hands were imported at first, but were subsequently made by George Hastings, who commenced a short time before their removal from Roxbury. Silver cases were also made to a limited extent previous to the removal to Waltham. This branch of the business was commenced in the spring of 1853, and was under the charge of Cabel Wescott, of Providence. The melting was done by Mr. John Moore. Movements cased in silver complete cost the company about \$18 for the work and the material, but if we were to include the cost of the experiments which Mr. Howard made the figures would far exceed that amount. The cases for the eight day movements were of gold, and were made by Messrs. Dubois & Co., of New York city.

But while the work was going on in the factory at Roxbury, Mr. Dennison had not been at rest in other directions. He claimed that the factory was not well located for the successful manufacture of watches. Mr. Dennison, in speaking of it, says: "Our location in Roxbury was not satisfactory. It was clay and pit-holes, or rocky land, and was even then too high priced for the greater portion of our employees to buy and build houses on. It was also very dusty in summer for the work in the factory." Mr. Dennison looked at various locations and consulted with Mr. Howard. The most desirable spot seemed to be at Stony Brook, a short distance above Waltham. But before locating there, the Bemis farm at Waltham, comprising 106 acres, was brought to the attention of Mr. Dennison, who visited Waltham and called on Mr. W. H. Keith, who had previously lived on the farm. He explained to Mr. Keith what they wanted, viz.: A good location where a considerable tract of land could be obtained and divided into lots, to be disposed of to the employees for homes. Mr. Keith thought favorably of the project. This farm, however, had then recently been sold to Mr. James Brown, of the publishing house of Messrs. Little & Brown, of Boston, but when the project was laid before Mr. Brown he consented to sell it for \$5,000 advance on the cost. This was on the first of December, 1853. Through the kindness of Mr. Keith the writer was able to make the following extract from a letter written to him by Mr. Dennison a few days previous. Mr. Dennison wrote: "From what I know of our wants and the disposition of the other members of our company, I have no doubt that we shall be able to take hold of the said farm. I would suggest for your consideration to settle

upon the sum of \$100,000 as the capital stock of the company, and divide it into one hundred shares of \$1,000 each. * * *

We should probably take twenty or thirty shares, provided we could direct the investment for improvements for the first three years, in favor of ourselves, and persons in our employ." Mr. Keith at once issued a circular setting forth the great advantages that would accrue to stockholders in this company. The result was the stock was all taken up by sixty persons within ten days after the issue of the circular, the Boston Watch Company taking \$30,000 of the stock. The farm was purchased for \$27,500, and notes given for the bonus of \$5,000 which Mr. Brown required. A lot consisting of four and a half acres on Moody street was also purchased of Mr. George Lawton for \$5,000. It was considered, on account of its location, a necessary acquisition to the other purchase. The next thing in order was the incorporation, which required a special act of the Legislature. After considerable discussion and opposition it finally passed both Houses and was approved by the Governor. We must, in this connection, mention one incident which occurred during the discussion of this bill in the House. A wag took a House document and on the back of it wrote the following lines:

"A Waltham patent lever watch, which, ere it goes,
Besides the hands, must have the eyes and noes."

Mr. Keith still preserves this document as a valuable memento of that time.

A meeting of the stockholders was called at Waltham, March 30, 1854. They named the new organization "The Waltham Improvement Company," and elected the following officers: Dr. Horatio Adams, President; Wm. H. Keith, Treasurer and Superintendent; Thomas J. Marsh, Clerk. The following gentlemen were chosen Directors: Ruben T. Davis, James Brown, Samuel Curtis, Edward Howard and Wm. B. Fessendon. The next business in order was the selection of a site for the Boston Watch Company's building, which was to be the first improvement. The lot chosen contained about sixty-one thousand feet and was beautifully located on the bank of the Charles river. The writer, however, is not able to state whether the location corresponds to the spot pointed out by Mr. Dennison, who visited Waltham in company with Mr. Shepherd, Mr. Lynch and Mr. Baker after it had been decided that they would remove to Waltham. Mr. Dennison stood up on a stone fence which ran down toward the river, near the present location of the Treasurer's office, and, stretching out his long arms in a truly prophetic fashion over a small field covered with hacmataks, and said to his companions: "There's where we will have the factory, right over there." The contract for erecting the factory was let at once by the Boston Watch Co., it having been decided by the Improvement Company to pay the money to the former and let them erect the building themselves. The building was in the form of an open square, 100 feet each way. Each wing was 25 feet wide, the center or main building being 40 feet square, and all 2 stories in height, with an opening at one corner sufficiently large for a team to pass through. The material of which the building was constructed was



concrete, being composed of lime, cement and gravel. The way in which it was used was to have planks held in place by frame work on each side of the wall and fill the space between with concrete, and when sufficiently hard to stand alone raise the planks and put in more of the concrete. This was all right in theory but not always in

practice, especially when a heavy rain came. The building had a solid appearance, but was not as solid as it looked. The end near the driveway fell out one day and caused considerable expense and delay to the company in repairing it. Mr. Hull, now foreman of the dial painting room in Waltham, in speaking of "those days," said: "Often we would jump up from our stools when we felt something jar for we all seemed to have a dread fear that the building would fall some day; but this never happened." The building was occupied in October, 1854, and then began the work of making watches in Waltham, which has become so famed in the matter of horological productions. And just here we take occasion to say that it is the opinion of Mr. Howard that largely through the labor and influence of Mr. Keith the location of the watch factory was established at Waltham.

The company then had about one hundred employees, and were preparing to push their business vigorously, at least so far as their means would permit. The \$20,000 Mr. Curtis had put into the company had long since been expended. Mr. Howard had put in some \$20,000, which he had been obliged to draw from his other manufacturing enterprise, and now the firm of Messrs. Fellows & Schell, of 23 Maiden Lane, New York, came to their assistance, and pledged themselves for \$20,000 more, at the same time taking the exclusive agency for the sale of the goods. The company were struggling to make ten watches per day, but it was more frequently that six only were produced, and very often at the end of the month it was found that not more than one hundred had actually been completed and put on the market.

Just in this connection we call to mind a circumstance related by Mr. P. S. Bartlett, who was at that time employed in the factory. He went to a neighboring village, which had been his former home, and, while sitting on the proverbial nail keg in front of the village store, was accosted by some of the natives, who wanted to know where he hailed from, and, being told, they still further inquired what he was doing in Waltham. He explained to them that he was working in a watch factory that was turning out 7 watches per day. This was a great surprise to them, for they did not even know that such a thing as a watch factory existed in America. They wondered where 7 watches a day could all be sold.

The movements were now made in two grades and were engraved "Dennison, Howard and Davis," with the exception of about one hundred, which were engraved "Fellows & Schell." All the business was transacted, however, in the name of the "Boston Watch Company," and had been for some time previous to their removal to Waltham, this name having been taken from the fact that the name of the "Warren Manufacturing Company" did not indicate the character of the manufacture or the location of the company.

Everything now went along in a fairly smooth way after the removal to Waltham, and the Improvement Company kept making improvements to the real estate, as fast as the annual assessments of 10 per cent. and the products of the farm would provide for. But worse times were in store for the Watch Company. The sales had dropped off, to quite an extent owing to the dull times preceding the panic which was soon to sweep over the entire country. In the fall of 1856 Mr. Howard took charge of the manufacture of the watches, and Mr. Dennison went out among the trade to establish, if possible, some new agencies among retailers. He was to some extent successful. The strong point he endeavored to make was that with two or three movements and a little variety of cases a dealer could have quite an assortment, as the movements were all interchangeable. But times grew worse and worse, and the Watch Company found themselves unable to meet their obligations. The consequence was the Boston Watch Company were obliged to make an assignment to Mr. Chas. E. Rice in March, 1857. Mr. Rice was now the assignee, but he had been appointed trustee some months previous to this, which had virtually given him the control of the business previous to the assignment. He was a manufacturer of straw goods in Boston.

We cannot pass on to the history of the formation of the Ameri-

can Watch Co., the successors of the Boston Watch Co., without glancing briefly in retrospect at the struggles and triumphs which attended the efforts of those who carried on the enterprise. Mr. Keith, in speaking of it, says: "It was a struggle, the like of which but few mechanical attempts have equaled. The time of its birth was most unpropitious as financial disaster was fast approaching. Those who were experienced watchmakers and repairers thought it a work of folly. * * * The great public who knew of the work in hand had no faith in its success." In a private letter to Mr. Keith, Mr. Howard says: "When I look back and bring to mind what I went through physically and mentally to start and perfect the watch business, I am astonished at the endurance and perseverance with which I stuck to the task, and my friends are more astonished than myself. Could I have seen beforehand the trials and tribulations I never should have made the first movement. Millions would not tempt me to go over the same ground. Mr. Dennison had given the business his whole time and energy, and he was determined, at least so far as he was concerned, to make this, the effort of his life, a success."

In this connection we must not forget to mention the name of Mr. Samuel Curtis, who had by this venture and other unsuccessful investments whitened his hair with care and brought himself down, in his closing years, to the verge of bankruptcy. But even after all these severe struggles on the part of those who formed the Boston Watch Company, they were not permitted to gain the prize which seemingly lay within their grasp. They, like many others, had to yield to the inevitable, and lose that which by their skill, energy and perseverance they were entitled to. But for the great financial crisis of 1857, it is but fair to say, they would have reached the goal so ardently sought. As to the division of honors between the gentlemen composing the Boston Watch Company it is a matter which chiefly concerns themselves, yet the future historian of the horological industry in America may make it a question of some public interest. It is undeniable that Mr. Aaron L. Dennison, Mr. Edward Howard and others who were in their employ invented the machinery for producing watches in general accordance with the method now in universal use in the watch factories in this country to-day. But which of the two men were the most successful in inventing and producing watches can, perhaps, never be known. Mr. Keith, in speaking of them, said: "Both of these gentlemen are certainly worthy of the highest commendation, in that they, assisted or unassisted, put forward measures to accomplish, with or without the principles and practices being known to them, which had been employed by Eli Whitney, and subsequently produced at the Arsenal at Springfield, Mass., and by the clockmakers of Connecticut, and applied the same to the manufacture of watches, and produced goods that were a credit to themselves and acceptable to the public and the trade." Mr. Howard, in speaking to the writer of the division of honors between Mr. Dennison and himself, put the matter in a nutshell when he said: "One could not have accomplished it without the other. Mr. Dennison never could have made watches without me, and I never would have attempted to make watches without Mr. Dennison."

(To be Continued.)

The Manufacture of Imitation Stones.



AN ARTICLE has appeared in the July 19 issue of the *Moniteur de la Bijouterie et de l'Horlogerie*, entitled "Diamants et Rubis." This article, in a rather startling manner, enlarges upon the dangers incurred by buyers of gems in consequence of the many deceptions practised abroad. The familiar blue aniline fraud is quoted, which could not possibly deceive a practical jeweler, as a stone, in finishing and mounting, is subjected to such a thorough scrubbing, that the superficial aniline film would certainly be washed

off. As far as diamond dealers are concerned, no dealer worthy of the name would purchase without holding the seller to strict account for any deceptive quality of his goods; and, furthermore, the average stone merchant has sufficient confidence in his own ability to judge of the quality of the goods he handles.

The coloring of pearls by bathing them in nitrate of silver, red, blue, brown and other colors with anilines and fancy dyes, and then exposing them to sunlight, is also instanced. In this manner fictitious black pearls have been produced, but a pocket lens in the hands of an experienced person will reveal an unevenness in color in all of these artificially colored pearls, very different, indeed, from the luster of the natural pearl.

The writer then dwells at length upon a supposed new variety of ruby, which it is claimed is puzzling experts abroad. The article reads as follows:

"Certain Genevan houses have put in circulation 300,000 to 400,000 francs worth of stones (rubies?) that possess qualities hitherto unknown. On analysis they proved to be composed of alumina, magnesia, protoxide of iron, sesquioxide of chromium and silica, just like other rubies. Their density was the same as that of the Oriental stone, the most precious of all. A chemist (no name given), in whose hands specimens have been placed for examination, could not say otherwise than that they were beautiful natural rubies of good quality.

"Notwithstanding this verdict, the experts were none the less convinced of the contrary. At first view, the red seems irreproachable, but to the experienced eye it is mixed with false reflections and the luster is uncertain. Although they scratch glass they have not the hardness of the true ruby. A still more important sign is the fact that the cleavage is not perfect. We know that all gems cleave according to their crystalline system; that they have a sort of fibrous structure like wood, which is taken advantage of by the cutter. Now, this fiber does not exist in these Genevan rubies. To still further extend the comparison, they resemble knotty wood. We have evidently to do here not with an imitation, because these rubies have the same composition as the true rubies, nor yet with an artificial reproduction, because the property of cleavage is absent. We are therefore presented with a very curious problem; as these rubies are neither wholly true nor altogether false, how were they obtained?

"We may suggest that, though until now the ruby has been regarded as infusible, some one has discovered a way to melt and combine a quantity of small rubies into a single large gem. Thus may be explained on the one hand the composition which is perfectly natural, and on the other the absence of cleavage which marks it as a manufactured product."

Many fallacies and absurdities are lurking in this article. In the first place, the statement that a chemist cannot determine the quality of these stones by analysis is preposterous. And besides, who would think of sending a valuable gem to a chemist to be analyzed, when we have so many delicate tests ready at hand for determining the genuineness of a gem without sacrificing it? The scratching of glass, which is said to have been resorted to, is no true test of hardness. Any common paste imitation will scratch window glass. It is further said that the cleavage of these stones is not perfect. Who would think of cleaving a ruby to examine its cleavage? The fact that the color is said to be uncertain or weak in places and the fiber or texture different from that of the true ruby, only too clearly proves that these imitations have not yet been subjected to any very searching examination.

The irregular structure, coupled with its low hardness, is amply sufficient to prove it no ruby. The case is further strengthened by the fact that these stones are scratched by quartz. We must conclude, therefore, that the new variety of ruby over which inexperienced wisacres are so much exercised, is only another of that long series of vitreous mixtures or fusions that have made their appearance from time to time in the gem markets. They are not crystalline

substances but fused compounds in composition almost identical with the gems, but, lacking the principal requisite, hardness, they can only be placed on the same plane with any ordinary imitation.

They do not even possess as much merit as a crystal or garnet-topped doublet, and fall into the same category as the pieces of green glass that have occasionally been sold as emeralds by unscrupulous dealers, simply because their color closely resembled that of the genuine emerald.

The supposed knotty texture referred to is probably nothing but the effect of the lines of fusion often observed in common glass imitations and at once establishing their true character.

These so-called fused rubies are stated to be the work of some ingenious Swiss, and if there were a grain of probability in the supposition that anybody has discovered a method of fusing many small rubies into one large gem, this would certainly be a most lucrative employment, and one which would affect the value of the genuine stone adversely. But the whole supposition is absurd—a baseless fabrication that will not stand a single test of sober science. There can be no question that these new stones are virtually the same as the so-called sapphires and blue beryls of recent years, the coloring matter having been changed to red in this case.

Mons. Feil, of Paris, was one of the first to produce artificial stones differing from the common run of imitations, which consist usually of 38 per cent. silica, 53 per cent. oxide of lead, 8 per cent. potash, and traces of arsenious acid, soda and aluminium, the colors being produced by the admixture of oxides of cobalt (blue), chromium (violet), manganese, nickel, or copper, or mixtures of several of these, to give intermediate hues. Imitations made in this manner are invariably soft, and their specific gravity is below 3.3.

M. Feil's production, however, was a blue line spinel. It was not crystallized, but a fusion that yielded readily to the file. Its color was quite a good blue, unless critically examined. So perfect was the deception to the eye that a large parcel of these pseudo-sapphires were sold in London as genuine, the last seller realizing as high as £20 a karat. Yet when they were examined by an expert the fraud was at once discovered, and, although for a time they were still forced upon the market as blue beryls, they soon found their true level and disappeared from the market.

Many of my readers are doubtless familiar with the "Violane du Cap," advertised to contain alumina, magnesia. The specific gravity of this stone was represented as from 2.95 to 3.06. It is an artificial production of the same class as those already mentioned, a vitreous mixture readily scratched by glass.

Beryl was one of the substances fused by Clarke as early as 1816 (Schweigger's Journal, vol. XVIII, p. 287). He fused Siberian beryl to a clear glass containing bubbles. The so-called Peruvian emerald he melted very easily into round, extremely beautiful beads free from bubbles, no longer having the color of an emerald, but rather resembling a white sapphire.

Mr. Greville Williams conducted a series of experiments in the same line. The specific gravities of two selected samples of beryl he found to be 2.65 and 2.66 respectively.*

In the course of his investigations Mr. Williams found that both beryl and emerald when fused before the oxyhydrogen blow-pipe were entirely colorless; and that when chromic oxide was added, and the beads first formed were again carefully fused, they acquired a fine green color, inferior, however, to the tint of the emerald. With the addition of cobalt a beautiful blue glass was formed, the shade of which could be varied at will. The effect of this fusion, however, was to lower the specific gravity, by reason of the passage from a crystalline to a vitreous state, 9 per cent. (from 2.65 to 2.41), and to lessen the hardness from 8 to much below 7, so that they were easily scratched by the file. When quartz was fused in the same manner the specific gravity was lowered from 2.65 to 2.19. The natural color remained longer in the emerald during the process

* Proc. Roy. Soc., vol. XXI, p.

than in the beryl, the edges fusing to an opalescent glass while the interior was still green.

Spinels have been artificially formed, and successfully cut and polished. Their hardness was 8, color so good that they were not distinguishable from the natural mineral. Two of the original crystals made by Ebelmann at Sevres are in the writer's possession, and are quite equal to natural crystals. They were broken out of the platinum crucible in which they were produced, at the Ecole des Mines, Paris.

Artificial rubies and sapphires were also made by Ebelmann, at Sevres, in 1848, by the exposure to a high heat of four parts borax and one part of alumina, and later by Gaudin through the decomposition of potash and alum with charcoal in a crucible.

By subjecting fluoride of aluminum to the action of boric acid in a carbon vessel this process yielded large thin rhombohedral plates. Deville and Carron, by the addition of fluoride of chromium to the last obtained rubies, and by the addition of a smaller quantity of the chromium, blue sapphires. Fluoride of aluminum and glucium, heated to a very high temperature in a lime crucible, have been made to yield distinct crystals of chryso-beryl.

Among the numerous investigators who have announced the discovery of methods of artificially producing diamonds are: M. Cogniad de Latour and Mons. N. Gamial, whose revelations were made in 1828; M. Despretz, and Dr. Hare of Philadelphia. Prof. B. Silliman also experimented somewhat in this direction. More recently Mr. James MacTears gave to the world a supposed wonderful discovery of this kind, which was unfortunately exploded by Prof. Maskelyne in "Nature," vol. XXI, No. 9, p. 203.

Then we have two announcements before the Royal Society of an elaborate series of experiments which he had made, but which appear to have borne no fruit, for the writer, on inquiring at the British Museum about the much-talked of Hannay diamonds, received substantially the same response that had been given him by Prof. Nevil Story Maskelyne, when he visited New York two years ago, namely, that the diamonds in question had been examined by Prof. Maskelyne, but that there was no evidence whatever to substantiate Mr. Hannay's claim to their production. In view of the unsubstantiated, mythical character of these reports, and the lack of other evidence, the writer feels safe in saying *that the diamond has never been artificially produced.*

We find in topaz over 100,000 enclosed liquid cavities to the square inch, and these cavities are also abundant in sapphire, chryso-beryl and quartz. It is at least probable, therefore, that in nature gems have been formed in the presence of water, perhaps heated under pressure, but great heat was hardly a necessary condition. The principal elements for the formation of gems are time, pressure, and the proper chemical conditions, which we have not yet discovered, and perhaps never may discover.

To revert to the so-called rubies under consideration, it is safe to say that no dealer of any experience is likely to buy any of these rubies as genuine, and as for private buyers, it lies with them to trade with responsible dealers in which they have confidence. How many of them can detect an imitation even of the common strass kind?

Sensational stories of this character start with little or no foundation, and seemingly corroborated by crude, semi-scientific explanations, they are eagerly seized by the press and devoured with avidity by the general reader. More credence is always given to them than to authentic painstaking scientific discoveries, brought before the public without sensational embroidery. The effect of this pseudo-scientific literature on the public mind is to be deplored. Erroneous impressions are created which multiply and take deep root. The hurried clipping of such fictions in disguise and their publication without comment or proof of their accuracy, should be condemned in the name of science.

GEORGE F. KUNZ.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

WITH the present outlook for an increased trade, it need hardly be told that wideawake manufacturers have in preparation an unusual number of taking novelties, but these, for the most part, will not be in stock until another month. Decided novelties, generally speaking, will not be offered to the trade until too late for these to be copied by others. In a word, the originators of the new things propose to have a full and undivided benefit of the same during their advent season. After this if they are copied, to quote from one manufacturer, "It will be so much of a compliment none will feel like complaining."

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NOTWITHSTANDING the general inclination to hold back the new things until the trade has fairly begun, there are many fresh designs and attractive goods already in stock. These show the tendency of the times, and give a very good idea of fashions in jewelry likely to prevail during the season of '86 and '87. A feature in gold jewelry is the chased finish, which is largely employed by all the leading manufacturers.

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ANOTHER feature is the association of platinum and gold. This is all the while increasing, being no longer confined to jewelry for gentlemen's wear, but largely used in ornaments designed for ladies as well. Many beautiful effects are produced by this combination, which occurs now in all articles of jewelry. Queen chains for ladies, as well as vest chains for gentlemen, exhibit alternate links or strands of platinum and gold, and the array of sleeve buttons for both sexes is an extended one. Some very pleasing samples of platinum and gold buttons are to be seen in the linked buttons. Scarf pins show this association, as do lace pins and brooches.

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THE disposition to more florid styles in jewelry, alluded to last month, is certainly growing, just as the fashion for wearing a profusion of jewelry is increasing, and yet it is pleasant to relate, this change has come about without bringing back the cumbersome ponderous effects of the past, or in the least detracting from the higher standards attained of late by our best workers in precious metals. In what is known as "fine" goods, the demand continues to be not only for intrinsic worth but artistic merit, and where these go hand in hand there is little cause to anticipate failure.

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FLOWER and insect designs appear to be as popular as ever. Bows and true-lovers-knots, so popular abroad, are worn to some extent here, both in plain gold and set with small gems. But crescents, horseshoes, coils of gold rope and fly pins are more popular. A few straight bar pins are still made, but the majority of new lace pins come in modified forms, such as an elongated spray, a partly furled sail, a fern leaf or other design that shortens the pin and breaks the

monotony of straight lines. Among new round pins or brooches are silver wire ones with a moonstone center.

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FINE enamel work, especially on silver, continues in favor and will be popular so long as fly and flower patterns prove acceptable. Silver jewelry of artistic design is just as popular as ever, and has come to be accepted as a standard article for day and *neglige* wear. This success of silver jewelry does not conflict with that of gold and gem ornaments, as each has a separate part to perform in a lady's toilet, all being required to make her collection of ornaments complete.

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MOONSTONE jewelry remains fashionable, and is likely to have an extended run owing to the admirable manner in which leading manufacturers have introduced it in silver. The newest moonstone jewelry is much of it uncarved and untinted, being set in spherical shapes in natural color, and depending on the stone's *chatoyant* reflection for its beauty.

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MENTION was made last month of the revival of the opal abroad and its possible return to favor in this country. The past few days have been seen a number of brilliant Hungarian opals mounted to order for ladies well known in New York society. Some of these were set in rings. A single opal, showing vivid and various colors and surrounded by diamonds, is recalled as one of the most beautiful finger rings seen this season. An unusually large opal, exhibiting a bright fiery flame of colors, was seen in a pendant made to represent a butterfly, the opal forming the body of the moth, the wings being a glittering profusion of limpid diamonds. In addition to these opals mounted by special order, are specimens set in rings, brooches and bracelets, and in stock by all leading houses. Dealers in fine gems have imported fine opals in larger numbers than before in many years, and these are being mounted in attractive designs for the fall and winter trade. The superstition which has operated so seriously against the opal appears to be dying out and its original attributes are coming to the front. The opal was not only favorably known to most ancient writers, but was esteemed beyond any other precious stone.

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NUMBERED with ladies well known in the social world, who have within a comparatively short time added opals to their collection of rare jewels, is the wife of ex-Representative Flower. This lady possesses an opal of unusual size which, it is told, has pink for its prevailing hue, with all the other iridescent lights that characterize the finest specimens. This magnificent gem is set in a finger ring and is surrounded by twelve clear fine diamonds.

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THERE are many varieties of opal; the precious or "noble" opal as it is also termed; the "fire" or reddish opal, which sometimes gives a fine play of colors; the so-called "common" opal; the semi-opal; the hydrophane opal—known in commerce as the Mexican; and the wood opal or opalized wood. The precious opal is found in Hungary and in South America. The fire opal comes from Mexico, the Faroe Islands and elsewhere. The Mexican opal loses its beauty

when exposed to water, and Sir Walter Scott took advantage of this fact in his novel of "Anne of Geierstein" when he ascribed to the opal that supernatural agency which has since worked so disastrously against its popularity. Perhaps if his readers had been aware of the fact that the Mexican opal can be restored to its original color by a moderate application of heat, they would not have turned the cold shoulder on all opals for so many years.

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THE precious opal, when held between the eye and the light, appears of a pale, milky, reddish hue, but when seen by reflected light it displays innumerable colors, in flakes, flashes or specks—in a word, all the colors represented by other gems are united in the opal. When the colors are in small flakes distributed over the surface, the stone is termed a harlequin opal, and when fine this description of gem is much prized, but the preference is for stones having the various colored fire in large flashes. Opals are always more brilliant on a warm day, and dealers who are aware of this fact will hold an opal in the hand a moment before displaying it in order to impart warmth to the gem. Really fine stones of large size are rarely found, and command, in consequence, fancy prices.

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DIAMONDS and pearls are everywhere worn by everybody who can afford to possess them. These are the gems *par excellence* most worn in necklaces. The neck ornaments, by the by, included in the jewels of the Duchesse de Morny, about whose trousseau so much has been heard of late, represent favorite styles of setting gems abroad and indicate also the wide license taken in such matters. One necklace consisted of a row of unusually large fine diamonds set close on an invisible mounting of gold wire, so that the effect, when on the neck, was that of a blazing circlet without interruption or end. A second necklace gave example of the light lace work background much employed in setting gems. It consisted of a flexible band set close with several rows of small but fine diamonds, through the center of which ran a strand of pearls. A third necklace presented a decidedly new arrangement and one likely to be extensively copied. This consisted of eight jeweled sprays representing roses and their foliage in diamonds of various sizes and differing colors. The novelty consisted in the fact that these sprays are each a complete and separate ornament, when taken apart, which can be readily done. In a word, the necklace can be divided in half and worn as two bracelets or as shoulder straps, or separate sprays can be made to serve as a brooch or pendant or ornament for the hair.

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SMALL diamonds in gold filigree or lace work make effective and desirable ornaments. These are oftenest presented, perhaps, in the form of a flower or leaf, and afford a beautiful framework in the center of which to set a cluster of colored pearls or a single fine specimen. Pearls of large size and rare purity are being mounted, in some cases on a gold pin, so that when the pin is thrust into the dress or hair the pearl alone is visible.

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WITH the growing popularity of colored stones, the demand for diamonds of decided color has naturally increased, and when these are of fair size and properly cut, their value is rarely fixed, such stones being held usually to fill special orders. A rarity, such as the old India diamond of a positive shade of pink, in the stock of a well

known Maiden Lane firm and noticed last month, is an instance at hand of a gem, the value of which must be the sum an enthusiastic connoisseur is willing to pay for the possession of a gem that will never be duplicated. This remarkable diamond, in addition to its rare color, is heart shaped. Other choice importations seen at this same house were a diamond of absinthe hue and a rose sapphire of large size. The gems mentioned are veritable treasures, and will find patrons among the wealthy few who recognize peerless stones when they see them and are willing to pay for their possession.

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TO THE uninitiated, the assortment of fancy colors exhibited in diamonds and to be seen in the stocks of leading importers is, indeed, a wonderful revelation. The list includes brown, canary, green, violet, amber, opaline, blue and other desirable hues. There appears at the present time a disposition to group diamonds of differing colors in one ornament; especially is this being done in finger rings.

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PEARLS of fancy color are also in demand; indeed both white and colored pearls are very fashionable. As pearls are found of almost every imaginable color, colored pearls are of frequent occurrence and are often set with a background of diamonds, the pearls in various shades simulating, sometimes, the fruit against a diamond spray or leaf. Again, the design is a diamond flower with a pearl in the center. While many colors are represented in the pearl, it is also true that colored pearls, of fine quality and large dimensions, are very rare and therefore all the more valuable.

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THE ruby continues to be a very fashionable stone, and there is a demand for sapphires of desirable color. The emerald, owing to the exceeding rarity of perfect specimens, can never become popular, but will always be sought after by patrons of means.

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WHEN one's purse will not gain for the owner rare colors in such precious stones as the diamond, ruby or the pearl, patrons are content with spinelles in various tints, fine beryls, tourmalines, chrysoberyls, jargoons and hyacinths. These fancy stones, as they are termed, present in the fine, well cut specimens some exceedingly choice colors and have gained a widespread popularity of late years. This popularity is due largely to the beautiful workmanship shown in the mountings, the artistic designs of the ornament and the harmonious groupings of color.

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LIGHT, graceful settings are the rule for all stones. The beauty of the gems are no longer sacrificed or interfered with by heavy, ponderous mountings, but the gems are thrown into relief so that the eye sees these only. This holds true, not only of most large, fine gems, but in many instances of small ones as well. An illustration of the latter is to be found in flower and insect pins where tiny stones set closely reveal no gold, but appear a brilliant surface.

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EAR rings are certainly coming on apace; not a boom, but a steady growth, the result of which will be favorably felt during the

coming autumn and winter trade by manufacturers and dealers. Balls continue to sell well, so do the little knot and flower patterns, while hoops, it is believed, have a future. Both balls and hoops are worn much abroad, and these styles will be found in stock here this fall. Some of the most attractive ear rings seen of late, have been gold hoops made of twisted wire and delicate openwork patterns.

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WITH the increased patronage of ear rings ear ring covers again come to the front. Every lady who has fine solitaires requires covers for these to wear when traveling, or at such times as she does not care to display rare gems. The new patterns in ear ring covers afford a wide variety from which to select, and some of them furnish exceedingly pretty ornaments. There are plain balls in satin finish, balls richly chased, balls overlaid with delicate traceries of gold wire and balls enameled. These covers are also made in other than spherical forms. There are urn shaped ones, oblong ones, also covers in copy of a rose and an acorn.

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THE increased use of studs by ladies is apparent. The white chemisite fronts and pleated vests worn with summer dresses have produced quite a demand, and the consequence is a large assortment in this direction. The moonstone appears in many of these studs; some are merely one little ball. Again, there are three smaller balls grouped. Sometimes there is a moonstone in the center with small diamonds around it. A new feature in studs for ladies' wear are those connected with a light gold chain, after the style of the button sets made for infants' dresses. Some chased gold ones seen were attached in this manner.

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THE silver sleeve buttons and studs introduced this year for ladies' wear, and finished with enamel to simulate figured linen, have taken remarkably well, being worn not only with the white dress fronts, but with thin summer dresses. This same finish appeared also on buttons for gentlemen's wear, being especially suited for wearing with colored shirts. The first ones introduced simulated a polka dot on a white linen ground, but now the buttons are made to represent a variety of small figures in delicate colors on a white ground.

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THE lever back and other patent buttons, of which there is such an infinite variety, have many of them proven very welcome conveniences and occur in great numbers in plated goods. These patent backs, however, are employed on comparatively few of the higher priced articles; generally speaking, if one wants a twelve or fourteen dollar pair of cuff buttons with a lever back these must be made to order. Manufacturers questioned on this subject have so far failed to assign any good reason why the patent backs do not oftener occur in the higher priced articles.

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THE bead pattern is attractively employed in some of the new bracelets. Samples seen at a manufacturer's show rooms on lower Broadway afforded a pleasing variety. In one style the bracelet was made with overlapping ends in bead patterns, which gave a finish on the top of two rows of beading; some showed a bright and some a

satin finish. Another effective style consisted of a bracelet with double strands of bead work all around the rim; this latter had a pendant in form of a ball swinging from a tiny gold chain.

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LOCK goods are out in great variety, the lock, in one form or another, being much used on both stiff and chain bracelets as a pendant. These locks are by no means confined to gold jewelry, but appear in silver, sometimes oxidized to the better represent the antique lock that is copied; sometimes enameled to give an attractive background to the gems with which it is set, and often showing merely the plain satin finish.

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THE star pattern is effective in gold jewelry. Cuff buttons seen employed the star pattern on a background of different colored metals and alloys with decorative effects.

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NUMBERED with decided novelties in silver jewelry is that on which are mounted "Cook's crystals" in form of little medallions. These crystals, which are cut and painted, have never before been set in anything but gold, and afford not only a novel, but very attractive ornament. Lace pins seen were in form of a furled sail, with a crystal in which was represented a yacht set in the center. The mountings in each pin seen corresponded in design with the painting in the crystal. These crystals are also set for brooches in a framework made of a combination of metals in rococo style.

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THE primrose pins, previously described as silver flower pins, enameled so as to simulate in hue, as well as form, the primrose, is counted with the popular flower pins and promises to have a run.

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THE fancy in watches is running more and more to decorative cases and faces. In silver, the cases are taking on irregular forms, and are not only exceedingly effective but artistic in their decoration. In illustration may be cited a watch with a black face and gold hands set in an open case with the ram's horn decoration; ram's horns intertwined border the face of the watch, and a ram's head is etched on the center of the face.

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HAIR ornaments are all the while growing in favor and now afford a bewildering variety. There are spears, daggers, crooks, arrows and the like, with and without jewels. Then there are gold pins mounted with butterflies, crescents and balls. Now and then one sees a jeweled comb. Some of the latter seen recently were finished on top with large gold or silver balls richly chased. Then there are combs made with tops of light openwork in gold and set with small gems. These combs are very effective when gracefully arranged among the coils of the hair.

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THE silver deposit process which was fully described at the time

of its introduction, has proven very successful and has been largely adopted for handles on umbrellas, parasols and canes. It possesses the triple merit of being attractive in appearance, enduring in quality and comparatively reasonable in cost.

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SILVER and gold trimmed leather goods in form of pocketbooks, card cases and the like, continue to find patrons and are made up for the fall trade in new and pleasing patterns. Book covers of silver are, some of them, beautifully enameled, and will prove welcome, doubtless, during the holiday season. The long, narrow pocketbooks with silver corners and clasps are having a run. In addition to these are some new purses in form of a long silk net bag with a circular cover of silver.

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WITH other pretty luxuries for the toilet seen in silver goods, are pin cushions of satin or velvet mounted on a silver standard. These come in several patterns and all sizes, from small ones for traveling purposes to those large enough for use on the toilet table.

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NUMBERED with conveniences for the table are silver trays on which stand crystal jugs for oil and vinegar, with salt and pepper shakers in silver of unique pattern.

ELSIE BEE.

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For further information, Application Blanks for Membership, By-Laws, etc., Address P. O. Box 3277. 170 Broadway, New York.

The following firms have been admitted to membership in the Alliance during the past month: Arnstein Bros. & Co., New York City, N. Y.; M. C. Haight, Geneva, N. Y.; Benj. J. Mayo, Newark, N. J.; Jos. P. Wathier, Chicago, Ill.

Gossip of the Month.

WE HAVE frequently noted the contrast between our government and that of several European nations in the matter of encouraging trade and commerce, and in seeking new markets for their industrial products. Our government does literally nothing to further the commercial interests of the country, while other nations lose no opportunity to push their industrial products into every market in the world. In addition to what the government of France is doing

in this respect, the merchants and producers are combining to secure an extension of their field of operations. We learn from a foreign exchange that a syndicate has recently been formed in Paris having for its object the protection and propagation of French industries. To this end it is proposed to send out inspectors to all countries where they can be practically introduced, and to install representatives of trade in all markets where it may be found necessary and useful. The syndicate has laid out four routes of exploration. The first comprises the United States, Canada, Mexico, Guatemala, Nicaragua and the West Indies; the second, the United States of Columbia, Ecuador, Peru, Bolivia, Chili, the Argentine Republic and Brazil; the third, Australia, Tasmania, New Zealand, New Caledonia, New Hebrides, Eastern Asia, China and Japan; the fourth is Africa, the Levant and the whole of Western Asia. This leaves very little for the rest of the world to capture. The syndicate is confident of creating in all these foreign countries outlets for French industries, and to inspire their respect and appreciation for the French trade mark. The syndicate is to be maintained by annual subscriptions, and every member will have the privilege of sending out his business cards, catalogues, price lists and samples to all the countries named without further expense, and trustworthy agents will be employed to represent them. Our commercial men and manufacturers might well imitate the enterprise shown by their foreign competitors in seeking to open a new market for their products.

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LAST year the British Government appointed a commission to inquire into the causes of the depression in trade then existing. We have published some extracts from time to time as to their investigations of special industries, which have been of considerable interest. The commission has now prepared its final report which is soon to be printed. It is stated that the report does not indicate any abnormal conditions as affecting trade, but the depression complained of is attributed to low prices and consequent loss of profits. The growth of competition both in the home and foreign markets is recognized, and the commission suggests that British manufacturers should endeavor to adapt their products to the requirements of foreign markets. The commission does not believe that legislation regarding labor has injured trade, but deprecates any increase in the hours of labor or any diminution in the rates of wages; the report also speaks favorably of labor organizations. The depression in trade in England is due, no doubt, to the same causes that have prevailed here, viz.: excessive competition, over-production, and a consequent cutting of prices that has taken the profits out of business of almost every kind. Add to this a lack of confidence in the future, and the wonder is not so much that we have had a period of commercial dullness, but that we have escaped a financial panic and a general demoralization of business. The suffering among the workingmen of Great Britain, however, has been far greater than among the same classes here, and some of the accounts of the distress prevailing in manufacturing centers have been pitiful indeed. So great was the distress among the working jewelers in some localities, that public subscriptions were taken up to furnish relief to keep them from starving.

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WHILE the great labor movement of the early spring was a decided failure, strikes in various trades continue to be made from time to time. These are not sufficiently extended, however, to cause much alarm, although they indicate that there is a spirit of dissatisfaction still existing among workingmen, and that employers need to be on the alert to prevent being taken unawares. The Knights of Labor

have been quarreling with other labor organizations, and does not seem to have that hold upon workingmen that it claimed a few months ago. Workingmen are apparently realizing the fact that it is not to their advantage to trust their affairs to an organization that assumes to regulate matters in all lines of industry. Such a contract is altogether too large for any one body of men to handle, and workingmen will find it to their advantage to keep the control of their special industries in the hands of men identified with such industry. It is the height of folly for the shoemakers of one section to claim the right to regulate the cigarmaking industry in another section, or for the railroad employees to dictate to the jewelers of Providence, New York or Newark. Yet this is just what the Knights of Labor assumed to do; they want control of every industry, and the right to say what the workmen in each shall and shall not do. Employers generally encourage their employees to organize associations within their own lines of employment, but they very naturally resent any interference with their business from the outside. A good workman, who is temperate and industrious, can generally afford to stand upon his own merits and does not need bolstering up by any labor organization. Trade unions are mainly in the interests of the incompetent workmen, making mediocrity the standard, and keeping superiority down to that level. But the trade organizations cannot expect to have everything their own way. Employers have as much right to organize to resist strikes as workmen have to prosecute them. If employers are pushed to the point of defending themselves, it may come that a strike in one shop will be the signal for a lockout in all shops in the same line of industry.

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It is pretty well understood in business circles that where a sale of goods is made and no terms of payment agreed to at the time of the sale, it is to be regarded as a cash transaction. A case illustrating this point was recently tried in the courts in this city. A gentleman in the trade introduced a friend to a dealer in another line of goods, and this friend purchased quite a bill of goods. The bill was sent to the dealer who had introduced the purchaser, and the usual trade discount was allowed. After the lapse of a reasonable time a collector was sent for the amount of the bill. Then the dealer demanded four months' time, which was refused. As he would settle on no other terms, suit was brought to recover the amount. On the trial he claimed that it was the custom of dealers in this line of goods to sell to the trade on four months' time, which was admitted. The seller, however, showed that at the time of the purchase nothing was said about time being wanted, and that as a consequence the transaction came under the head of a cash sale. The court sustained this view of the case, and the dealer was required to settle the bill at once. The amount involved was not large, but to establish a principle the suit was brought. It may be taken as an established fact that when goods are sold and no agreement made between the parties as to the time of payment, either verbally (which must be susceptible of proof), or in writing, (as on a bill-head) the payment is due immediately on the delivery of the goods, and the matter of credit is within the option of the seller. Except with the consent of the seller, the purchaser is not entitled to time whatever may be the custom of the trade. Under this ruling, it may be said that all sales are cash sales unless terms of credit are arranged previously to the delivery of the goods.

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THE business outlook has not been so promising for an active trade for several years past, as during the past month. Indeed, it has not only been promising, but the promise has been fulfilled to a considerable extent, for orders came in lively during the month

and many buyers were in the city making purchases on a liberal scale. In our visits to manufacturers and dealers, we found them all busy, and wearing that peculiar smile of satisfaction that is only seen when business is lively, and all hands busy. Reports from all sections of the country are favorable, and dealers everywhere are hopeful. Well the jewelry trade can stand a large amount of prosperity this season, for it has experienced a long period of dullness which cannot be compensated for by a few months of activity. What we hope for is a continued season of activity, not in the way of a rush or a "boom" nor in fitful spurts, but a steady, reasonable demand that shall be uniform month in and month out. With the exercise of proper care to avoid overstocking the market, and by abstaining from all attempts to push goods upon buyers beyond their capacity to dispose of them, there is hope that the activity that has now set in may be prolonged indefinitely.

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PERHAPS there is no better gauge to the business situation at large than the volume of merchandise going forward to the different distributing points by the interior and coast transportation companies. Tested by this standard, the reports of the various companies are very gratifying, not only as regards the business in hand, but the look ahead. Most of these lines report trade better than at any time during the past four years. With Texas, Louisiana and Florida, notwithstanding the damage to crops by the prolonged drouth, there is every indication of a satisfactory trade. Buyers of dry goods, groceries, and other staples, as well as dealers in jewelry, are already in the market, many of them have placed their orders, and others are looking over stocks preparatory to doing so. From all the principal trade centers comes the same reports of low stocks in the hands of retail dealers, and a demand among consumers that promises well for a prolonged busy season. The four great trunk lines of railroad, while not committing themselves as yet to any statistical statement of their transactions, are unanimous in the opinion that the present autumn will develop a far better general business than the corresponding months of last year. When the railroads are crowded with freight, and the express companies kept busy, no better signs of business activity are required. New Yorkers who live in Jersey, and are obliged to cross the streets leading to the freight receiving stations of the various railroads, can bear witness to the volume of business going forward by them at present. The streets are so blockaded with trucks, drays, etc., that the crossing of a street by a pedestrian is a work of time and skill.

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THE rate of interest has decreased wonderfully in the past fifteen years, and this fact has had much to do with increasing the competition in industrial pursuits. A daily paper recently gave a list of railroad bonds, thirty in all, that are dealt in on the New York Stock Exchange, which bear interest at the rate of seven per cent. They have an average of eleven years to run, and all but two are quoted above par, the average price being about 120. A person investing in these at the market price, will find the rate of interest on his investment very much below seven per cent.—in fact, it would be only about five per cent. Some of the best of these railroad stocks now yield less than four per cent. Government bonds are so much above par that the purchasers of them have to be content with a very low rate of returns on their investments. There has been such a large increase of capital in the country in the past few years that money is worth very little compared to former times. Capitalists have found their incomes sadly reduced in consequence of this fall in the rates of interest, and are seeking other and more profitable fields for their investments. It is a popular idea that every sort of

manufacturing industry ought to pay at least twenty per cent. profit upon the capital invested, and hence men with money are not averse to becoming interested in manufacturing enterprises. They argue that at least they can get better returns than they can from the average of stocks or bonds, and they are willing to take a little more risk to secure larger profits. The days have passed when large returns are to be counted upon from almost any investment; capitalists and business men in general have got to be content with smaller earnings and gauge their expenditures accordingly. They must also count upon increased competition, for wherever an opportunity is presented for making money, there will be found ten men to improve it where there is only enough for one. The fact is, people are getting too thick in this country, and in order to make a living they are compelled to crowd and jostle each other in a manner that is neither pleasing nor profitable.

THE losses by fire in this country during the month of July aggregated over \$10,000,000, being an increase of about \$3,000,000 over the average losses for July during the past five years. The annual fire waste for a number of years has exceeded \$100,000,000, and bids fair to come considerably above those figures this year. This is a terrible drain upon the nation, and constitutes a waste that no other nation is subjected to to any such extent. It means that we destroy every year an amount of property equal in value to one-fifth of the profits of all the labor and all the enterprise of our people; it is equivalent to a tax of about \$12 on each taxpayer in the land. The cost of maintaining fire departments, and the cost of insurance, together with other contingent losses resulting from fires, brings up the cost of the national ash heap to about \$300,000,000 a year. About one-half of the loss is paid for by the insurance companies, who immediately charge it up to those of their policy-holders who do not have losses—the companies never pay out a dollar they have not collected from some one else. But the worst phase of the fire loss is the hardship imposed upon workingmen, thousands of whom are thrown out of employment for greater or lesser periods every year in consequence of the destruction by fire of the factories and shops wherein they earned their livelihood. From the loss of wages results much suffering and distress to themselves and their families. Not ten per cent. of the fires that occur result from nnpreventable causes; nearly all of them are occasioned through carelessness, recklessness, or malice. Ordinary foresight and the exercise of an average degree of intelligence would prevent almost all this fire loss. It does not speak well for the honesty of our people when it is shown by the statistics that nearly one-half of all burnings is the result of incendiarism, and that the incendiarism is induced by over-insurance. When men of a certain stripe find their business running behind, their obligations maturing, and no way to meet them, they insure their property largely in excess of its value and then set fire to it. Cases of this kind are of daily occurrence, but are so difficult to prove that the conviction of an incendiary is a rare thing. But if every person would take ordinary precautions to prevent fire in his premises this national waste would be largely reduced. Carelessness is the principal cause of fire, and individual care would speedily remedy this. In the list of fires of last year, watch factories, case factories, and jewelry factories and stores appear with more frequency than would be expected or than is creditable to the trade—there were, in fact, seven factories burned and 108 jewelry stores.

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THE trade depression in England had the effect of considerably increasing the number of failures. The number given for the first

six months of this year is 2,919 as against 2,599 during the first six months of 1885. From the first of January, 1885, to June 31, 1886, the number of jewelers and watchmakers who failed was 122, only including the retail dealers. In addition to the failures recorded, there were many private settlements of which no record is attainable.

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OUR Consul-General in Germany reports the establishment of a large factory near Bremen for the manufacture of aluminum on an extensive scale. The Germans claim this to be the only factory of the kind in the world, but readers of THE CIRCULAR will remember that two or three years ago we gave an account of a factory established at Cleveland by E. H. & A. N. Cowles for the manufacture of aluminum by a process that was destined to revolutionize the traffic in this metal. They have conducted the business successfully, and have succeeded in reducing the price of this metal materially. Louis Napoleon spent large sums of money in trying to develop the manufacture of aluminum, under the impression that it could be made useful in finishing military equipments. Aluminum combines lightness with great durability, beauty, and plasticity. It can be drawn into fine wire (down to one-fifteenth millimeter in thickness) and beaten into thin lamels. It is capable of taking a fine polish and can be engraved, and, by galvanism, silvered and gilded. In the air it does not tarnish, and in water it remains unaltered. Though it is not a precious metal, it is, notwithstanding, not more subject to corrosion by acids and alkalis than iron. It is, however, not fire-proof; by combustion it is reduced to valueless alumina. Its fine, white, silver-brilliant, not-tarnishing color makes it very adaptable for ornaments of all kinds, opera-glasses, etc. Besides the pure aluminum, also its alloys are useful for many technical purposes. A particularly beautiful bronze, brilliant like gold, is obtained from 90 to 95 per cent. copper and 10 to 5 per cent. aluminum.

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COREA is developing large mineral resources, and has begun to export gold in considerable quantities. In 1883 the export of gold was less than \$30,000, but some enterprising Chinamen, with a good sprinkling of Yankees, went into the country, and, as a consequence, the exportation of gold jumped up in 1885 to \$357,148, in addition to which a considerable amount was sent overland to China, of which no record was made. It is estimated that 20,000 persons are there engaged in gold mining, but they work by the most primitive methods, the mines being flooded about half the time for the lack of suitable pumping machinery. Copper, iron and coal are also found in Corea, and it promises to become an extensive mining country.

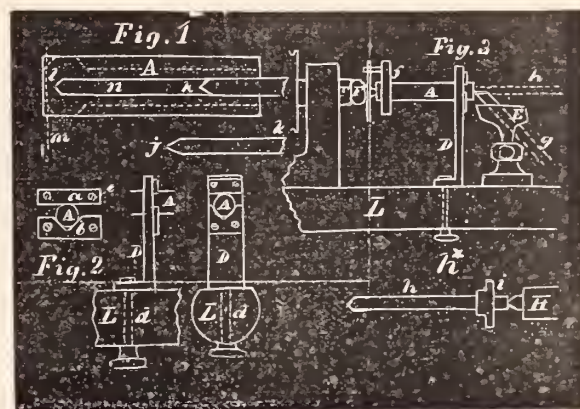
Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.



WE HAVE now all the essential parts of our micrometer callipers complete. The details of making the parts further than has been explained can hardly be necessary. How to put the parts together will suggest itself to any skillful mechanic. In November number, 1885, the complete instrument is shown, and since that time all the unusual requirements for producing the parts with great accuracy have been given. And for the writer to go on and say, put a screw here, or a steady pin there, would only be a waste of words to

any mechanic who could successfully make such an instrument. The description has already exceeded in extent what the writer intended. But the need of such or similar accurate measuring tools, the watch making fraternity is becoming more and more aware of every day. The only fault to find with the one described is that it is troublesome and expensive to make. But I sincerely hope it will suggest simpler and less expensive ones to my readers. The writer, when he commenced to describe the micrometer callipers just completed, promised to give tables and rules for calculating the relative size of wheels and pinions. These tables are in process of preparation. There is no especial intricacy or difficulty in calculating these tables except the labor and care to avoid mistakes. To guard against these (mistakes) two persons go over each calculation twice, doing this at different times, and as soon as complete they will be given. Another valuable feature to these tables will be that other and less expensive measuring instruments can be used, which, if not so exquisitely (if I may be allowed the phrase) accurate, will be sufficiently so to satisfy almost any person. And while these tables are being prepared, the writer, at the request of several of his friends, will give a method of making split chucks for the American lathe. Any person who has an American lathe and needs additional split chucks can, if they feel so disposed, make them. If you have a back rest all you will need additional will be a splitting or sawing device to make the three incisions, which make a split chuck of the piece you have turned and fitted. A piece of Stubs' round steel large enough to form the largest part of the chuck is the first thing required. This is to be cut up into lengths sufficient to form a chuck. We need not allow more than $\frac{1}{8}$ of an inch in excess of exact length required. A simple form of back rest is shown in fig. 2, and consists of a piece of heavy sheet brass (No. 7) bent at c to a right angle, by which it is attached to the lathe bed L by a screw shown at d . The piece of brass D should be about 2 inches wide by 4 long before bending. At the



top of the brass piece D is a hole a little larger than the piece of Stubs' steel we are to make our chuck of. This hole is made to correspond and line up to the center of the axis of the lathe. Two pieces of No. 10 or 12 brass is now made as shaped shown at $a b$; b is attached to D by 2 screws. The upper piece a is also attached with two screws, but one, say the one shown at e , works in a short slot so a can be firmly pressed on the piece we are to make our chuck of, and the screw is working in the slot firmly set up so the piece A is held steadily by the three points of support, i, e , two on b and one on a . We can now center and drill our piece A as shown in fig. 3, where F represents the lathe spindle, A our blank for a new chuck and E the tool rest. If we are very particular we can make only a very light centering at the end f until the end at g is centered and drilled just to secure a correct center; then change ends and turn out the temporary center and drill again to secure this center. If our chuck is to carry something very small, allowance must be made so the center hole drill pit and all can be turned off subsequently. We are now ready to drill our blank out as shown at n , fig. 1, where the form of the finished chuck is shown at the dotted outline. We select a new twist drill of the correct size to produce the hole in the interior of our chuck. And if we are making a dozen new chucks

this hole n can all be of the same size; it is only the hole at l which is ultimately to grasp any job which need vary in size, and these made at near the end of the operation. The drilling of n is now done, approaching the drill as shown at the dotted lines h , fig. 3. At diagram h^* is shown the twist drill for drilling n , and on it is mounted a disc or button for holding the drill h while it is drilling the hole n . At H is shown the dead center of the lathe which serves to keep the drill upright, and also to press it forward as the hole n advances. The disc i is slowly revolved as the drill is cutting. We continue the drilling until there is only metal enough left at l , fig. 1, to ensure perfection in our ultimate job. We now take a piece of steel wire which will just go into the hole n and back rest it, and turn a conical point on it as shown at k, j representing the wire. It is essential that the point k should be exactly central, and this should be ensured by making new pieces at $a b$ adapted to the size of wire used for j . After k is hardened it is forcibly driven into n by blows of a light hammer to establish a true, keen center to what is now the drilled tube n . We now file the end of the blank A , fig. 1, off to the dotted line m , which is supposed to be just enough to remove the centering at l (the little drilled hole and all). Now, with a fine long drill we drill from the centering made by k from the inside out through the solid part of the steel at l . We have now perfect centers for one blank corresponding to the axis of the hole n . We put the blank A into our lathe, and turn the outside of A into the form indicated at the dotted outline for a chuck to be subsequently split. In making split chucks it is very essential that the 3 parts into which the chuck is split should be exactly of the same size, for if one is stronger and stiffer than the others, it will resist the efforts of the drawing-in spindle and throw the work to one side or out of true. To ensure the equality of these three parts we must be positive our hole n is exactly in the center or *axial*, as it is termed. Next, we must make the three splits which divide the chuck into exact divisions. As we have arranged it, we have now our blank so that on putting it in the lathe and allowing one center of the lathe to go into the small hole we drilled at l , and the other into the open end of the hole or tube n , we have the blank axial. If, now, we turn up our chuck on these centers and make our splits three exact divisions radial to these centers, we will have our 3 pieces forming the chuck exactly of the same size. If, now, we have a good sized foot lathe where we can put our blank to rough it down to near the proper form it will facilitate matters; but the ordinary watchmaker's American lathe will, with a little patience, soon bring down the excess of steel. When turning such heavy work (and indeed for any work) we should have to commence with 3 or 4 good sharp gravers. In my next communication I will tell how to fit the parts to correspond with our lathe.

Mounting the Lick Telescope.

THE TRUSTEES have awarded the contract for mounting the 36-inch objective (now in the hands of the Messrs. Clark, of Cambridgeport,) to the firm of Warner & Swasey, Cleveland, Ohio, for the sum of \$42,000. Messrs. Warner & Swasey were successful in a competition which included most of the celebrated makers of the world. One of the celebrated makers (the Repsolds, of Hamburg,) declined to compete on account of the short time available for the purpose. The mounting proposed by Messrs. Warner & Swasey will include every one of the improvements which have been lately introduced into the mountings of large telescopes, with the addition of one or two improvements peculiar to themselves.

The telescope is to be 57 feet long; the diameter of the tube is 42 inches. The tube is suspended at the middle, and the point of suspension is to be 37 feet above the floor of the dome. The axes on which the tube moves are supported by a heavy iron column, 17x10 feet at its base. Provisions are made by which it is possible

for an observer at the eye end of the telescope to command all the possible motions, and these same motions can also be controlled by an observer stationed on a small balcony 20 feet above the floor. It is expected that, in spite of the great size of the telescope itself and of the great weight, the mechanism will be so delicately adjusted as to render the use of power unnecessary.

Messrs. Warner & Swasey are to have this mounting completed in April, 1887, and some time during the summer of 1887 the glass will be brought to Mount Hamilton, where the mounting will have already been erected under the great dome, now building at the Union Iron Works, San Francisco, so that one may look forward to the completion of the Lick Observatory some time during the next year. It is impossible, without an accurate description, to give any complete notion of the excellence of the provisions which have been made by the Lick trustees. A rough idea may be had by considering the cost of the various parts of the great telescope, dome, mounting, etc.: Cost of the dome, \$56,850; cost of the mounting, \$42,000; cost of the visual objective, \$53,000; additional cost of the photographic objective, \$13,000; total, \$164,850. Besides these sums, several thousand dollars will be required to put the instrument into its final completed state.

Problems in the Detached Lever Escapement.

BY DETENT.



THE RIGID system of inspection to which all the escapements made in American watch factories is subjected, prevents (as a rule) many glaring faults from getting into even the very cheapest grades. The place where we find them is cheap Swiss, imitation American, as the writer remarked at close of last article. Some men who destroy watches have a trick of filing the end of the fork as at $a a$, fig. 1. In such cases restore the fork to the form shown at $b b$, fig. 2. To do this and restore such a lever escapement to a healthy action is the problem now to be considered. I said healthy action; I beg pardon, such watches are unhealthy at all times, but they are like a doctor's patients, must be doctored even if he knows they will never be anything but invalids. In bringing a fork to the correct form we need not restrict ourselves to not marring the fork; all we desire is something approaching a sound action. Whoever rounded off the angles of a fork as shown in fig. 1, done a great deal more harm, even if he polished up the entire fork like a mirror, than a man would who would heat and blacken it if he obtained a correct action. Usually such forks are soft enough to stand some stretching. This can be ascertained by trying the fork with a file; if too hard, remove the pallets and pallet staff and heat the end to soften it. Some parties would say make a new fork. Yes, this is all very well, but who is going to pay for it? A watchmaker is very silly to work for glory, especially on such trash. Only make your watch go and keep on going, and then get all you can for the job, and I will warrant you not to get suddenly rich from all you will earn on such work. Set your depthing tool from the balance hole jewel in the potence and hole for the pivot of the pallet staff in the top plate to represent the depth of the fork and roller. In setting the depthing tool, care should be taken to get the depth correct by drawing out the point which goes into the sink where the foot of the balance staff goes, and keeping the depthing tool perpendicular to the top plate. A little practice, having these ideas in view, will soon enable one to set the depthing tool properly. Sometimes the size of the balance precludes the use of the depthing tool; then we must work by putting the pallet staff and fork into the plates. There is no way work should be done except in a methodical manner, so we will proceed to describe the details of doing it. After the fork is softened sufficiently to allow of stretching it; we can stretch it directly with the pear end of our hammer or with a punch used in a staking tool. Any

person who has a Hall's staking tool is all right; but for those who have not, a common mainspring punch can be used. Such a punch is shown in fig. 3. When we get them they have only a round punch *E* with a corresponding hole at *d*. The punch *E* is usually about $\frac{3}{16}$ of an inch in diameter, and the hole into which the punch goes is about $\frac{1}{32}$. For our purpose, we put a new punch into the place of the round pointed mainspring punch *E* with the lower end made into a sort of dull chisel-shaped point as shown at diagram *E**. Into the little hole at *d* is placed a short stake shown separate at diagram *d**, the pin *e* going into the punch hole at *d*. The great objection to this arrangement is the small hole at *d*; but if the main piece *B* is softened, the hole at *d* can be broached out; so the hole at *d* is $\frac{1}{16}$ or $\frac{1}{8}$ of an inch in diameter. Into this hole little short stakes with larger pins, as shown at diagram *d***, can be fitted. If the stake shown at diagram *d*** has a hole drilled through the center as shown at the dotted lines, we can use it to punch mainsprings precisely as was originally intended. But for our purpose, viz., stretching a lever fork, we put in a stake shaped as shown at *d*, fig. 4; this view is seen precisely as fig. 3. We lay the fork *j* on the stake and with a small hammer strike *E*, producing a series of indentations as shown at *g*, diagram *j**. This will elongate or stretch the entire fork, but it will throw the hole (*h*, fig. 1,) for the guard pin so far forward that it will probably have to be filed out or partly out, so we drill another hole at *j* and put in a pin as shown at *j*, fig. 4, August number. Generally such jobs can be done by simply flattening the angles at *a a*, and also closing in the two other angles as indicated by the arrows in fig. 1. Which of these two courses to pursue the reader will determine by the nature of the job in hand. After the fork is sufficiently stretched we put it and the pallets together, and put both into the depthing tool as directed above, if the balance will permit, and proceed to fit the fork to the jewel pin. If the depthing tool can not be used we put the pallet staff into the plates, and also put the balance staff (after removing the hair spring) with roller and jewel pin in position and screw down the balance bridge. We can generally put the two pillar screws, which go on each side of the barrel, in place, and leave the top plate loose enough so we can put in and take out the fork to fit and try it. We now, with a thin separating file, open the slot *c*, fig. 2, to fit the jewel pin. Because, if we wish to get the end of the

granted that any one part or action is correct. If the pupil or reader has studied the action of lever escapements from the large model so earnestly insisted upon early in these papers, he can tell at a glance if any of the parts are far out. I have told the reader that the 30° roller action was not imperative, and here is an instance. We will suppose the size of roller was intended for a 30° action but it was set too far away, consequently we would have to lengthen (stretch) our fork. To illustrate, we will take the drawing at fig. 5. The lines *o p* represent the lever action of 10° with the center of the pallet staff at *t*. Now, if we establish the center of roller action, i. e., the balance staff at *r*, and sweep the circle *u* to represent the arc the jewel pin describes, where the circle *u* crosses the lines *o p* represent the angular motion of the jewel pin when in action with the fork, and in this case supposed to be 30°, and represented by the lines *w w* forming the angle *w r w*, supposed to be 30°. If, now, we remove the center of the pallet staff to *s*, using the same size of roller and sweep the circle *v*, we find the lines *o p* to embrace more of the arc of roller action than before, and the angle *x s x* is 40°. And some of our American factories use even a larger arc of roller action. I have no disposition to get up an argument as to which is the best, 30° or 40°, of roller action; all I wish to do at the present is to have the pupil understand that the stretching of the fork does not demand a change of roller. It may not be amiss to say in regard to extended arcs of roller action that the jewel pin will pass deeper into the slot *c*, fig. 2, and it requires an extended arc of the balance to unlock the escapement. In the present problem all we require is to fit our fork so that the slot *c* is deep enough to permit the jewel pin to safely pass as the balance vibrates, leaving the angles *b b*, diagram *A**, to be cut to the right length and shape, as soon as we have ascertained if one pallet action is all right, a matter to be considered in our next interview.

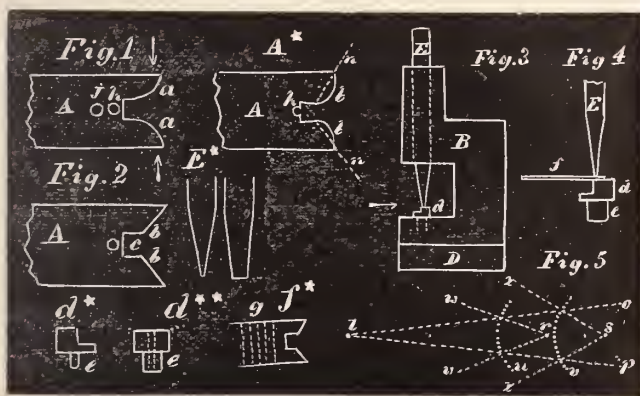
New Gold Fields.



THE KIMBERLEY gold fields, in Western Australia, are beginning to send nuggets into Sydney. Some of these run from half an ounce up to 100 ounces. The gold is only slightly water-worn, so it cannot have traveled far from the quartz where it originated.

According to the *Mining and Scientific Press*, a rush has already set in from Western Australia and from New South Wales. Large numbers of diggers, storekeepers and others, have found passage round westward, while others from Victoria, New Zealand, etc., have arrived in Sydney, whence steamers are being specially laid on, most of which will call at the Queensland ports, en route, to pick up additional miners. The two places of debarkation are Port Derby (King's Sound), and Cambridge Gulf. It is stated by some parties that this will be the largest gold field in Australia. It has been estimated by Mr. Hardmann, the government geologist of Western Australia, that an auriferous area of country, extending over some 3,500 or 4,000 miles, exists. The latest information is a telegram from Perth, which states that a miner named Morgan has returned to Port Derby with a large quantity of gold, including a nugget of solid gold weighing 2½ pounds.

The newly-discovered Patagonia gold field extends from Cape Virgin, on the northern shore of the Strait of Magellan, along the Atlantic shore some 50 miles. The gold country is easily accessible, and the deposits are known to be rich. There is a gold field also in the Transvaal, South Africa. In the closing week of last year 2,560 ounces of gold were received at Natal. Further north rich deposits of gold and baser metals have been found, south of the Zambesi. This region is but little known to white men, but if it is as rich as represented, tens of thousands of white miners will soon be in Central Africa. Northern Thibet is another region which is known to contain vast quantities of gold, which will very soon be exten-



fork shaped as shown in fig. 1 in the correct form shown at fig. 2, we must flatten and stretch the angles at *a a* and also close in by striking in the direction of the arrows. The slot *c* should be opened just wide enough to admit the jewel pin freely but no extra side shake, taking no especial care of the angles at *b b* until the depth between the fork and roller is established. We keep on deepening the slot at *c* until it will permit the jewel pin to pass back and forth; make this deepening a little in excess to be safe. We have now come to a part of our problem where we must theorize a little. But first let us exactly understand the conditions of situation. The form of our fork is now probably very near, as shown at diagram *A**, the hole for the guard pin partly filed out, and the angles at *b b* rounded and too full; these will ultimately have to be cut away at about the dotted lines *n n*, but exactly where is the conundrum. If our escapement was otherwise correct we would have some definite points to start from, but in such cases as we are considering we can not take for

sively worked. It is an upland region, with underlying rock, and there is from 16 to 20 feet of soil, all of which is auriferous. Then there is gold in abundance in Mantuhria, a region in China, near the Russian possessions. Reports of wonderful finds come from Madagascar. As all these places are at great distances from us it is difficult to get any definite information from or concerning them. The further gold fields are away the richer they appear to be to those who read of them. To none of these places mentioned has a poor man any business to go with only money enough to pay passage to the fields.

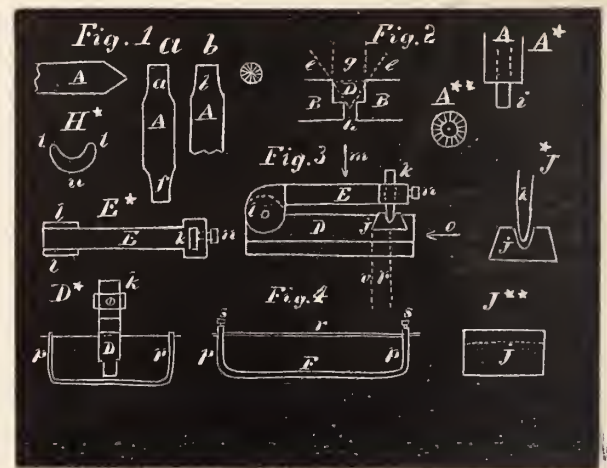
Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



THE ROSE drills, mentioned in last article, are best made of Stubs' steel wire about $\frac{1}{10}$ of an inch in diameter. It is as well to make them all of the same size wire, but have the cutting points of different graduated sizes, so as to be adapted for different sized screw heads. The manner of making is simple enough. We will commence with the cone point which is used to "start" the others. But it is first necessary to make our drills. If an American lathe is used, all we need do is to select a Stubs' wire which is about $\frac{1}{10}$ of an inch in diameter and fits one of our split chucks, and cut off, say, 4 pieces 1 inch long. The first we turn to a conical point, as shown at *d*, fig. 1. We next file it in grooves as shown at *d*. The best way is to start these grooves with a graver as near equidistant as possible. There should be about 15 grooves for such a taper of $\frac{1}{10}$ of an inch in diameter. If you have a wheel cutting attachment it is easy to cut such a conical countersink. Of course, the grooves will run to be very fine at the point, but the point is not intended to cut but follow a hole already drilled. After the spaces are started with a graver a fine 3-square file is used to deepen the grooves. A small file, known as a dove-tail slide file, is the best file for this purpose. The other pieces of steel wire are turned at the end as shown at *a b*; *c* is an end view. The ends are cut into teeth by first starting with the graver and deepening with the file as directed for the conical point. We can cut a rose drill on each end of our bits of wire as shown at *a A f*, fig. 1. The sizes should be graded to about $\frac{1}{100}$ of an inch difference. These drills are hardened and then ready for use. Suppose the screw sink of a spectacle joint is out of shape, and we wish to enlarge it a little and cut in a new and better sink. At fig. 2 is shown (enlarged) a vertical section of a spectacle joint, *B B* representing the joint and *D* the sink we wish to enlarge. We first insert the conical point *d*, as indicated at the dotted outline *e e*, and start a conical sink which will just receive to steady the point of one of the square ended rose drills (such as are shown at *a b c*) and indicated in position at the dotted lines *g*, fig. 2. The sink can be enlarged and smoothed to receive a new screw head. Such rose drills are eminently useful for gold specs and also for many other jobs. By making such rose drills with a hole in the end, into which a pin is fitted as shown at diagram *A**, we can use them to mill out joints, letting the pin *i* go into the hole where the joint pin goes. The pin *i* is inserted into a hole at the dotted outline above *i*. Spectacle screws can be made to good advantage by persons who have apprentices who are learning to turn. This applies particularly to gold specs. Good screws which follow a proper tap, is much better than to force in a screw which only imperfectly holds at best. Concave gold wire for making and repairing bows of gold specs is sometimes not so easy to get, and very frequently it would be much quicker and consequently cheaper to put in a new eye than to mend the old one, and even after it is mended it is only an inferior job. A simple affair for making concave wire is shown at fig. 3; it consists of a piece of cast iron, *D*, which is held in the bench vise. To *D* is hinged a jointed arm *E* which carries a swage *k*; below *k* at *j* is a

small block or female swage. And it is between these the wire is placed when *k* is struck with a hammer. The piece *E* is best made of hard red brass. A top view of this piece (*E*) is given at *E** as if seen in the direction of the arrow *m*. The piece *E* is jointed to *D* at *l* by means of the two cheek pieces *l l*, shown in fig. 3 and diagram *E**. At *k* is a slot into which goes the male swage, which is held in place by the set screw *n*. The pieces *D* and *E* should be about $\frac{1}{2}$ an inch thick, and the male swage *k* the same width, as shown in diagram *D**, which is an end view of fig. 3 seen in the direction of the arrow *o*. The lower (female) swage is dovetailed into *D* as shown. The wire to be made is stretched in a wire frame as shown in fig. 3. The wire (*p*) of which the frame is made should be heavy enough to give the wire (*r*) which is to be swaged a strong tension and prevent its becoming contorted. There is no particular length to be considered only for convenience sake. If the bow *F* would



take 18 inches of wire it would probably be enough. It is well to hard solder brass or German silver pieces of wire to each end of the gold wire, to enable us to use the entire length of the gold and consequently no waste. A piece of No. 2 hard drawn iron wire will make the frame *F*. The wire frame *F* is provided with 2 set screws *s s* which holds the wire. To use our little machine we must first understand the principles involved, as there are some features not, as we may say, entirely new, but certainly not in common use. And the most prominent among these is the swaging under tension. The wire frame *F* not only serves to keep the gold wire straight but also prevents its twisting. It is well to commence and make trials on brass or German silver wire, or even annealed steel wire. We put a piece into the frame, fastening one end with one of the set screws *s*. Now, the loose end of the wire to be swaged is drawn through the other end of the frame *F* by springing the two ends towards each other, and fastening the loose end with the other set screw *s* so as to get a rigid tension on the wire *r*. In making the lower or female die *j*, there is no especial form to be observed except to make the bottom of the groove in *j* a very little convex, as indicated at the dotted line in diagram *J***, which is a view of the lower die bed seen in the direction of the arrow *o*, fig. 3. The male or upper die is also convex but in the opposite direction. The groove in *j* is to be exactly shaped as we want the outside of the grooved wire. A transverse section of the grooved wire is shown magnified at diagram *H**. There need be no guide or edge to form the edges *t t*; they will rise and form themselves. But I can warn the reader that the shape of the female die has much to do with the edges *t t* rising in good shape. The same male die *k* can be used for lighter or heavier wire by changing the female die *j*. The lower die where it forms the part of the grooved wire at *u* makes a good deal of difference to about the action of the gold. I think by having the dies at *u* a little less than a true circle, we get the best results. In using the cast iron block *D* is screwed into the bench vise to the dotted line *v*, so the bow *F* can hang perpendicular under the swage about at the dotted line *p*, fig. 3. We lay the wire *r* into the groove in *j*, swing the arm *F* over it so the male die *k* rests on it; we next strike the top of *k* good

solid blows with a hammer. We move the wire *r* back and forth by the frame *F*, keeping up the hammering. There is no need of any guide—we simply keep on hammering and moving until we rise the edges *t t* to our mind, and get the wire with a groove even from end to end.

United States Senators and their Jewelry.



SENATOR Joe Blackburn, of Kentucky, is, perhaps, the most bejeweled man in either branch of Congress. Last week he added a huge blood-stone ring to the gems that adorn his person. He wears it on the third finger of his right hand and is constantly toying with it. On the little finger of the other hand is a small gold band with a tiny diamond set. When the Senator pulls out his watch one is rather dazzled by the amount of jewelry seen about the timepiece. Besides the rings and watch there is a heavy gold chain, winding from the top vest button down to the pocket, and above and beyond all flashes a diamond scarf pin, which is considered the finest thing of the kind at the capital. It was presented to the Senator by political friends in Kentucky, and is said to have cost several hundred dollars. He is exceedingly proud of the pin, whether on account of its brilliancy or the associations connected with it, deponent sayeth not. Mr. Blackburn is not the only Senator who wears a noticeable amount of jewelry. In fact, those staid old Solons in the north end of the Capitol have more of it on their persons than the members of the lower house. It is also noticeable that the quantity worn by each is in almost exact proportion to his baldness. Coke, of Texas, has the most hairless pate in the Senate. He is also, next to Blackburn, the most resplendent with gold and preciousstones. On the little finger of his right hand is a large cameo of which are original with them, to enable them to do the artistic ring, the cameo cut in the shape of a star, an emblem, it is supposed, of the "Lone Star State." His watch chain, if solid gold, must have cost a month's salary. The Senator is a big man—in fact, the biggest in the Senate—and that chain, with its large, heavy links, traverses the whole length of his vest and leaves a portion on his trousers, below the watch-pocket. A shirt stud, with some kind of a bright stone which can be seen occasionally beneath the shaggy beard, and a pair of enameled gold sleeve-buttons complete the list of his personal adornments. Harris, of Tennessee, whose head is saved from absolute baldness by a few straggling white hairs, wears two rings on the third finger of his right hand. The inner ring is plain gold and almost as thin as wire, while the other is large and has a square black set. To his chain is attached a gold and pearl locket. Above it are a Masonic pin and enameled studs.

Senator Edmunds has perhaps the prettiest ring in the Senate. It looks like a child's ring, has a lovely red cameo set and is worn on the little finger. Whenever the Senator is particularly interested in following the argument of an opponent, his eyes are bent intently on this ring, and he seems to be wholly engaged in ascertaining its quality. This was notably the case during the debate on the resolution calling on the President for the papers in the Duskin matter. While Kenna was speaking in defence of the President, Edmunds did not raise his eyes from the pretty cameo except to take notes occasionally.

Senator Logan wears only one piece of jewelry—a small, gold ring, which appears to be sunk in the flesh of his little finger. Hoar, of Massachusetts, has a serpentine ring and a scarf pin from which sparkles what is said to be a blue India diamond. Senator Ingalls wears a disreputable-looking black band on one of his fingers and a hair watch chain, which is concealed, however, by his closely-buttoned coat. All his vanity tends toward eye-glasses. Of these he has three pairs, and they are positively gorgeous. He is always swinging one of them around his fingers while listening to a debate.

Harrison, of Indiana, wears a delicate little blue-stone ring which adorned his father's hand when the General was in the White House. Bowen, of Colorado, has the biggest diamond pin the writer has seen in Washington. It is whispered that he won it, in his early Colorado days, in a game of draw poker with a miner who had struck it rich and who had, after the manner of the first silver kings, at once invested in diamond ornaments.

It is noticeable that the great millionaires of the Senate have very meager personal adornments. Stanford, of California, has not one bit of gold or a precious stone on his person. His watch chain is plain silk, and his collar button, which can be seen beneath his flowing tie, is of bone, such as are sold for ten cents a dozen. Sawyer, of Wisconsin, wears no rings, a silk chain and a flat gold shirt stud. Fair, of Nevada, with his \$45,000,000, wears nothing in the jewelry line except a small chain, which is drawn tightly from the button-hole to the pocket. Jones, of Nevada, carries a little silver watch from which hangs a fob. It might be remarked here that all the millionaires, Sawyer excepted, have full growths of hair, while the bejeweled Senators above mentioned are nearly all hairless. Whether any general conclusion can be drawn from these facts is a question, but surely the coincidence is striking.

Trade Catalogues.



AMERICAN illustrated trade catalogues excel all others in the world. No other country produces any in comparison. With them catalogue printing has become a wonderful and distinct business in itself. It is conceded by the most distinguished European art critics that Americans have surpassed all other nations in printing, and have well-nigh done so in wood-engraving. The great silverware houses of this city publish more costly and gorgeous catalogues than any other line of trade. They usually issue one edition of 7,000 copies, because they have about that many customers. One house on Broadway paid \$100,000 for its edition of 7,000 last year, while other silverware houses paid sums ranging from \$35,000 to \$50,000. Another house, besides publishing a trade catalogue, issues a handbook for its customers, at a cost of \$6,000.

The \$100,000 catalogues were of folio size, and contained 400 pages. They contained about 4,000 words and steel engravings and photographic and lithographic sketches. Each book weighed about fourteen pounds. The big edition consumed forty-five tons of the finest and heaviest calendered paper, made expressly for the purpose, and of a higher grade than used in any other work of the bookmakers' art; twelve tons of cardboard and 3,000 yards of the finest silk cloth for the covers. The presswork alone for the 7,000 copies cost \$3,000, and 210,000 sheets of gold leaf and 49,000 sheets of silver leaf were used.

To print the covers of the books three colors are used. This requires the use of three different plates. The first prints the ground-work, and is worked cold, while the last two, which print in the gold and silver leaf, must be worked hot. Now, in heating these plates they expand one-fourth of an inch, so that allowances must be made for the expansion—a difficult job, indeed, when some of the figures are very minute, and an imperfect register would result in great loss.

The lithographic work is the chief point of interest, for as many as fifteen tints are often used. In some catalogues a one-page design of three plates cost \$1,200. One large house on Beekman street, whose goods include wash basins made of chinaware with colored designs, pays \$150 a page for plates. A publishing house up-town, which makes a specialty of issuing yearly a co-operative catalogue, charges \$500 for a one-page design.

The Hoffman House has got in press a catalogue that will cost \$20,000. It will require 100 pounds of ink, costing \$30 a pound,

or \$3,000 in all. It will contain sixty-eight pages, with sketches by Bouguereau, Correggio, Chelmonski, Etienne, Sadler, Ball, Schlesinger and Nast. The design of the book is by Charles Sibley May. The title will be "A Cluster of Gems from the Hoffman House Collection," which also conveys the idea of the book. The sketches will be full-page, and will not cost less than \$200 a page.

In the more economical catalogues, such as those issued by the hardware, stove, locomotive, machinery and cutlery houses, there is no such expensive character of work, but they are printed in the best manner possible, on good surface book paper, and illustrated with the best wood engravings. The cost is often from \$8,000 to \$12,000 for an edition.—*Sun*.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

The hopeful condition of trade prospects which was indicated in your last month's issue has been amply sustained during the past four weeks. The beginning of August finds the wholesale trade feeling unusually bright and expectant, and scarcely a single jobber can at present be found who is not looking to an unusually brisk fall trade. The experience in the dry goods, boot and shoe, and other staple lines of business is equally encouraging, and points distinctly to an easier financial feeling and better times ahead.

It is generally admitted that there has been a steady increase in all the leading lines of business during the last three months, although a slight check was caused during the second week of August. This, however, was only due to the expansion of business, which caused a stringency of money that made rates of interest harden. Both East and West so great has been the demand for money that $1\frac{1}{2}$ per cent. more has been charged for its use than during the weeks immediately preceding. Such a state of things does not show that anything has gone wrong with commerce, but simply indicates that the increase in the flow of business has been too fast. A great deal has been said and written about the shortage in the corn crop, and some croakers and interested speculators have done their best by colored reports and other means to make the outlook as gloomy as possible, but in spite of such dampers it is absolutely known from the best qualified sources that there is sufficient old corn in the country to meet every necessary demand, even though the growing crop should prove an utter failure. The best estimates agree that there will be in the neighborhood of a two-thirds crop, and this, with the 600,000,000 bushels of old corn that is allowed to be in store, will amply supply any possible demand. All the bigger jobbers report steadily improving business. One important firm assured your correspondent that the 13th of August was the biggest day they had known since the great bulge last December. If the testimony of the letter-carriers amounts to anything, it tells that the mail has been getting increasingly heavier all summer.

Travelers who have come in from Michigan and Wisconsin say that in spite of the great forest fires trade is going to be immense. From Ohio and Indiana and Illinois equally encouraging reports keep pouring in. To come right down to facts, May is the only really dull month that the jewelers have had this year, and this is abundantly explained by the labor and socialistic troubles that, for a time, threatened to paralyze the entire trade of the western metropolis. Collections are generally reported to be much better, and this without doubt is doing much to sustain an easier feeling in the wholesale trade. Minnesota is the only State from which any reports at all to be regarded as discouraging have come. It must not be forgotten in this connection, however, that farmers there are in the middle of harvest, and have not the time to devote to the consideration of luxuries. It is known, though, that not a few

travelers will bring into the city from eight to ten dealers each when they return from their trips.

Mr. Allister, of B. F. Norris, Allister & Co., still maintains that the forecast of business which he gave last month will prove correct, and that the fall trade on which the jewelers are just entering will prove better than anything that has been known since 1881. Even the most sceptical of jobbers have by some mysterious force been won round to the belief that active trade lies straight ahead, and large purchases have been the result. The retail trade has picked up materially during the month of August, and it would appear that when the consumer is feeling good better days must be in prospect for the jobber. Mr. Stein, of Stein & Ellbogen, says that he felt impelled to make large purchases for the fall trade, so great was the general confidence that things were going to make a move for the better.

The jobbers of Chicago have been widely scattered during the last few weeks. Some have been going abroad on business errands, and others have been returning with full lines of goods. A universal contagion seems to have caught all for buying, and some of the finest lines of goods that have ever been shown in Chicago are now on exhibition.

C. K. Giles has returned from a two weeks' business visit to the East, and is briskly engaged in drawing attention to several interesting novelties. His new \$1.85 dust-proof case is gaining justly due popularity. It is made in both the snap and screw form, and each is fitted with one of the approved anti-magnetic shields which in this instance is almost practically given away. Another interesting novelty introduced by the same firm is a gold case watch with anti-magnetic shield and fancy aluminum dial, ornamented with fancy Roman figures. Mr. Ollmann, the expert diamond cutter, who was for over three years in the employ of Giles Bros., died at his eastern home in the beginning of August of consumption. He learned his business with Morse, of Boston, and was much esteemed in the local trade for his ability and virtues. He was only 28 years of age. Mr. Giles announces that his diamond cutting business will be resumed about September by a thoroughly qualified expert.

Considerable public attention has been directed for some weeks to the celebrated agate watch on view in the store of S. Hyman & Co. The watch, which is of rare beauty of construction, was designed by Mr. Wills, foreman of the jewelers room of the Waltham Watch Co., and brought to Chicago by Mr. Taisey, of Robbins & Appleton. The plates and bridge of agate contrast strikingly with the jewels and bright metallic parts of the works, and the watch is one of the handsomest fancy articles ever put on exhibition. It is said that Robbins & Appleton will shortly put on the market a select number of these agate watches at the price of \$250 apiece.

Among the personals it should be mentioned that M. C. Eppenstein, who has been for some time East, has returned with a fine line of goods. W. F. Taft, of the Blauer Watch Case Co., John F. Morse, and Thomas Davies are back in Chicago after more or less extended visits to the East.

The improvement mania seems to have seized the large jobbers. Benj. Allen & Co. have commenced work on their important State street store, and soon visitors to that well-known and commodious establishment will discover how comfortable and easy it is to do business on one large floor. Matson & Co. have put in a new glass front, bringing their windows out flush with the front of the well-known granite pillars which have been such a prominent landmark at the corner of State and Monroe streets. The important building which stretches from No. 63 to 67 Washington street has now been completed. A handsome elevator and other business conveniences have been fitted up, and all future visitors to Clapp & Davies, M. C. Eppenstein, Holmes & Edwards, R. M. Johnson, Wendell & Co., and the Hartford Silver Plate Co., will be attended with the utmost dispatch. Lapp & Flersheim have also completed the improvements that render their store one of the finest and most commodious in the city.

H. C. Clark, of Clapp & Davies' material department, was married August 17 to Miss Abbott, of Chicago. After an extended eastern trip the young couple will be at home to their friends at No. 366 West Congress street.

Samuel Swartchild has been absent from business for over two weeks from ill-health, but favorable hopes are entertained for his speedy recovery.

Wendell & Co. were grossly taken in to the tune of over \$300 by the so-called World's Pastime Exhibition. A little pretty pointed expostulation, however, has led to the recognition of their claim, and Mr. Wendell now holds ample security for the debt.

Messrs. Clapp & Davies are working day and night on their new catalogue, which promises to be one of the finest ever issued by any western jobber in jewelry.

Otto Young has gone to the country with his family to spend the close days of summer. B. F. Norris only spent about two weeks in the great summer resort of the West. He has got deeply interested in lucrative building enterprises in San Francisco, and cannot extend his stay in Chicago. The building business is now Mr. Norris' hobby.

Messrs. B. F. Norris, Allister & Co. have had new corrugated glass reflectors placed in their north and south windows, and the result is an excellent, well focused light.

A good joke was obtained at the expense of Messrs. Clapp & Davies about two weeks ago. Some wag who had come into possession of a statement form belonging to the firm, credited them with having supplied Mr. Parsons, the anarchist, with sundry clock movements and bomb-regulators, and the firm laughed heartily when the form which had been picked up in the streets was presented to them by a Chicago reporter.

Great regret is expressed in the trade over the death of John Ballentine, of Findlay, Ohio. "Johnny," for such was his familiar name, was intimately known to the local trade, having been successively in the employ of Messrs. Bowen, Happel and Swartchild.

Mr. Ellbogen, of Stein & Ellbogen, has gone to Amsterdam, Holland, on a diamond buying expedition. W. A. B.

Condition of Trade in Philadelphia.

To the Editor of the Jewelers' Circular:

The watch club business is dying out and the instalment plan is coming in. It is quite surprising to know how many watches are sold on this plan. The houses who do this business are not first-class, of course, but they handle good goods and sell at reasonable prices. They are not to be found on Market or Chestnut streets, but on streets like Eighth, Ninth, and Callowhill. Your correspondent saw to-day within the space of 20 minutes over \$30 paid down for watches. Some call and pay, others are called upon by collectors. I am told the difference is only 10 per cent. between the instalment price and the bona fide price or cash price. Hundreds are carrying watches in this way who would not have them, and who, it is safe to say, never would have them. Handsomely engraved and massive gold watches are preferred by the vast body of buyers. Taste may dictate less ornamentation than formerly, but the populace has a law of its own. Plated goods are going out with a certain class of people and coming in with another. The ordinary buyer buys a \$60 gold watch and thinks a \$5 plated chain is good enough. As it is, it looks as well and wears better.

Pins, buttons, etc., are not bought as much in jewelry stores as a few years ago. They are run out by the dry goods houses and the innumerable "cheap Johns." But fine pins are still sought after in our first-class jewelry houses, as even some of the best houses on Chestnut street told me no longer ago than this morning that their sales of really fine pins and cuff buttons of odd design were never better. No wonder designs are odd and original, and, in fact, ugly. People who despise hypocrisy will go any length rather than endure the unspoken accusation of wearing cheap plated goods.

While there is an increasing demand for foreign watches, their sale, as compared to American, is falling far behind. Word from our factories shows great activity. The fact that the works can be lifted out and listed back helps the American watch. Convenience is a strong point in its favor. The American watch may need more frequent adjustments, cleanings, etc., but it will always remain in favor.

The trade prospects are good, in fact, very good. People feel more like spending money than a year ago. The specter of hard times is removed. The sky is bright, people, high and low, are hard at work and making money, abundance of work is in sight, all are hopeful and confident, our mills and factories are crowded with orders, machinery of all kinds is working ten hours a day—some of it twenty hours.

We anticipate a continuance of these favorable conditions. The displays in our windows are certainly inviting. We hear no rumors of financial trouble. No trade changes are in view at present. We are on the eve of a good fall trade, and we anticipate an influx of business in all branches of industry and business that will cheer the heart of the most despondent. QUAKER CITY.

BIRMINGHAM, England, Aug. 9, 1886.

To the Editor of the Jewelers' Circular:

With very few exceptions, the Birmingham jewelry trade is in a very depressed state. Manufacturers have been hoping for improvement, but as yet cannot see where it is to come from, as the fashion of wearing flowers instead of jewelry still holds its own.

The few exceptions to the general depression are makers of solitaires, and a few firms who, having more enterprise than the others, are always called upon by buyers requiring novelties. As bracelets are very little worn now a few ladies are wearing cuffs, and dealers' stocks of solitaires have run so low that they are obliged to give out some good orders for solitaires.

The "fichu," or bar brooch, has been very fashionable for some months, and, following in the same line, an arrow is now being very generally worn. This is made in all qualities, but some very pretty ones in 15 karat gold, with a circular disc set with pearls, corals, etc., in center of the arrow, are selling in large quantities.

Those who for some years past have been prophesying the disuse of silver jewelry seem at last to be about to have their prophecy fulfilled. The quantity of silver goods being sold is very much smaller than for several years. This is especially so in silver chains; all makers of fancy silver chains are very slack, and, in consequence, a large number of females have been thrown out of employment. Makers of Hall marked gents' silver Alberts' have not so much cause to complain, but the profits on these are so exceedingly small that some chain makers refuse orders except at an advance on trade price.

The gradual disuse of silver is rather an advantage. As silver jewelry goes out of fashion the wearing of gold jewelry becomes fashionable, and although the quantity sold is not so large the amount of money turned over is greater and the profits better.

The public have been so often swindled by buying goods as silver which have been two-thirds a white composition and one-third silver that they now demand that every article possible shall be Hall marked. This is done by the Goldsmiths' Co., and is the best guarantee we have until Government are prevailed upon to undertake it.

We have had a large influx of visitors from the Colonies to the Indian and Colonial Exhibition in London; we in the jewelry trade have been visited principally by Canadians. This made some makers very busy for a time, as there were a few good orders given out for special lines. We have also had some friends from India buying jewelry for that market, for which the demand seems rapidly on the increase.

Some of the exhibitors from the Cape are endeavoring to bring into fashion a stone called "Crocodylite," which was discovered

there about four years since. It is brown in color, but being very strongly impregnated with iron, it varies in shades from a bright yellow to a very dark brown. It is principally cut in Germany, and the stone dealers there have discovered a means of bleaching it and then staining it any color they choose. The colors most generally used are blue, green and gray. By pricking a piece of stone with a streak of lighter color in the center and cutting it into the shape of a cat's-eye, a very good imitation of a cat's-eye is obtained, especially when the stone is stained gray; these are sold then as "real Cape cat's-eyes." A great quantity is being sold at the "Colonies" and in some of the London shops, but when the Exhibition is over it will at once go out of fashion.

At first there was only a small deposit found at the Cape. It was at once brought to England and sold for as much as £2 per karat. It is now almost valueless until cut, as since first discovered such large quantities have been found.

SOLITAIRE.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

LUNG DISEASES OF JEWELERS.

To the Editor of the Jewelers' Circular:

It is a well known fact that the occupation of jeweler is one that is productive of lung diseases in all its various stages, from acute catarrh of the lungs to pulmonary consumption. The cause of this is the sedentary habits, confinement, often in a vitiated atmosphere of fine dust of metallic substance, etc. The want of the necessary fresh air and exercise, the occupation and the surrounding conditions of most jewelers, predispose to lung disease even where no hereditary taint exists. I find many jewelers otherwise healthy suffering from catarrh and bronchitis of a most aggravating character. Frequently the occupation has to be abandoned and a change of climate sought before any relief is secured from these diseases.

Having been a sufferer for a number of years from catarrh and chronic bronchitis I would call the attention of my fellow sufferers to my means of relief and cure. Dr. M. M. Griffith, Verona, Allegheny Co., Pa., presented me with a box of crude petroleum pills, the formula of which I will send to any address free, and they can be put up at a moderate cost by any druggist.

As the pills are harmless, no particular directions are necessary in their use. Perhaps, as a general thing, it would be best to purchase them already prepared. Their efficacy consists in the healing properties of the crude petroleum they contain, while cubeb and bloodroot are known specifics for lung and bronchial diseases. For a number of years I felt that I would have to give up my business and seek a warmer climate. A friend called my attention to these pills. I commenced the use of them with little prospect of a cure. I used them as a troche by dissolving in the mouth and swallowing. The relief to the irritation and soreness of the lungs was apparent from the first few pills taken. After using them at irregular times during three months I was radically cured. It is now three years since I used them, with no return, but I resort to them at the first appearance of any throat trouble, and prompt cure always follows their use. I have induced a number of my friends to use them, and always with satisfactory results. The Doctor informs me that he is convinced that the pills, if taken in time, will cure almost any case of catarrh and chronic bronchitis, that a number of cases of consumption to all appearances were cured. The nauseous taste of the crude oil is disguised in the combination for the pills. Much more

might be said in praise of these pills, but THE CIRCULAR is not a medical journal. Yours respectfully,
C. M. POWERS.
DuBois, Pa., August 5.

A FEW WORDS OF COMPLIMENT.

A subscriber in Louisiana says: "I have been a reader of THE CIRCULAR for ten years, and have all the volumes bound back to 1876. My father is also one of your subscribers. I would not be without it"

A Mississippi subscriber says: "Inclosed please find two dollars, for which send us THE JEWELERS' CIRCULAR from the time we left off. No one knows the value of THE CIRCULAR except those who have failed to receive it."

A Georgia subscriber writes: "Inclosed please find money order for two dollars for one year's subscription. You may count me as one of your permanent subscribers who cannot do without THE CIRCULAR."

A Philadelphian writes as follows: "I think THE CIRCULAR of this year is an improvement over last both in regard to quality and character of the articles therein."

THE QUESTION OF PROFITS TO RETAIL DEALERS.

To the Editor of the Jewelers' Circular:

I have been a subscriber to THE CIRCULAR for many years, and am free to confess that it never suited me so well as during the past year. While I like most of the technical articles, and am sure that they all find interested readers, I am also pleased to see that you give space to articles on current topics of interest to all citizens, whether they are jewelers or not. There is much in political and business circles that we ought to consider in their relations to trade interests, and it seems clear to me that trade journals should have their say about them as well as the purely news or political press. I take great interest in the communications you print in each issue, and I hope members of the trade will freely avail themselves of the opportunity you offer for an interchange of sentiments. The more we discuss trade features as they are presented to us in our daily routine of business the better it will be for all.

I was pleased with your remarks relative to dealers charging a liberal profit on their sales, and I know from my own experience how easy it is to be talked out of a legitimate profit by a customer who threatens one with a competitor's prices. But let me ask how we are to maintain prices when we have to compete with outsiders who do not depend on their sales of jewelry for their profits, but simply carry a stock to attract attention to their legitimate lines? We simply cannot do it. As long as jobbers and manufacturers will sell to outsiders, and so multiply competition, retail dealers must be content to accept any prices they can get for their goods, and be thankful if they keep out of the poor-house. It appears to be useless to urge upon jobbers the necessity of protecting the retail trade; they seem to see their interests in selling to outsiders and so cheapening goods of all kinds and bringing the name of jeweler into disrepute. The results that were to have been anticipated are being realized, for manufacturers and jobbers are complaining that prices are so cut that there is no profit in the business. In short, they are beginning to realize that they have killed the goose that laid the golden egg for them. When trade was confined to legitimate channels, there was a chance for the manufacturer, the jobber and the retail dealer each to make a fair profit on their sales, but since the outsiders have been admitted to full communion and the choicest plums of the feast forced upon them, the margin of profit has been so whittled down that there is little in it for any one. We might add that the verdict is, "Served them right."

Ohio, August 19.

RETAILER.

TRAVELING AUCTIONEERS AND THE RETAIL DEALERS.

To the Editor of the Jewelers' Circular:

There recently visited this section of the country a traveling auc-

tioneer, who had a stock of plated ware and also some jewelry, so-called, with which he made a big show. He came here at the time the county fair was being held, and there were large numbers of country people in town. He made a special effort to secure their trade, and I must say he was quite successful. He advertised largely by circulars and handbills, and when he was selling his voice could be heard for two or three blocks. The goods he sold were of the very cheapest variety, the plated ware being of the kind made to sell at auction, while his alleged jewelry was entirely innocent of gold in even infinitesimal quantities. I examined the goods, and saw at once that they were bogus in every respect. Still they looked as good as similar articles of value in my shop windows, and I could see the countrymen and women stopping to compare their auction purchases with the goods I exhibit. That audacious fraud succeeded in taking a good deal of money out of the place, of course at the cost of the legitimate retail trade. I warned the public through the local papers against these auction goods, but of course I am regarded as an interested person, and prejudiced against the auctioneer who was underselling me. I had the consolation, however, in seeing one of our city fathers badly sold on some goods he bought, and I shall have his hearty co-operation this fall in having the city license for these auctioneers placed at such a high figure that they cannot afford to pay it. If they are charged \$50 a day for a license, they will be pretty apt to give this section of the country a wide berth.

ANTI-HUMBUG.

Illinois, August 21.

JOBBERS AND OUTSIDE DEALERS.

To the Editor of the Jewelers' Circular :

There has been so much said in your columns and elsewhere about manufacturers and jobbers selling to outsiders that it would seem that there is nothing new to be said on the subject; still, it is such crying evil, that it should be continually talked about, even if it involves the frequent repetition of well known facts. Until this practice is broken up, retail dealers can have no control over their business, and can never know what amount of competition they will have to contend with. I have seen the statement made that the goods sold to the outsiders are of an inferior quality to those made for and sold to the legitimate trade. This is an absurdity, for you can go into Macy's or half a dozen bazaars in this city and find precisely the same goods that you will find in the stores of the retail jewelers. There are jobbers in this city that make a regular business of selling to the bazaar men and other outsiders, and who do not pretend to protect the retail dealers. These jobbers have no difficulty in obtaining any goods they want directly from the manufacturers. What is the difference, I would like to know, between selling to a jobber whose principal trade is derived from outsiders, and selling to the outsiders themselves? Yet there are manufacturers who declare that they never sell a dollar's worth outside of the legitimate trade, but they do sell to jobbers who supply this outside trade, and with the full knowledge that their goods are going to the bazaar men. One of these outside jobbers stated recently in my hearing that he sold chiefly to Macy, Ridley, Stern, and other outsiders in New York, Wannamaker, of Philadelphia, and that he was making special efforts to cultivate that trade. He was asked if he had any difficulty in obtaining goods, and he replied that he did not have the slightest. This man had his grievance also, for he said he found that he had to compete with the manufacturers themselves who, as soon as he had worked up a customer outside, jumped in and tried to sell him direct. So it becomes a case of diamond cut diamond, but between the jobbers' and the manufacturers' competition for the outside trade, the retail dealer bids fair to be ground pretty fine. The various associations in the trade are exceedingly virtuous so far as denunciations of these practices go, and profuse in promises to protect the retail dealers, but I would prefer to see some vigorous action to quite so much pro-

testation. Perhaps a few summary expulsions from these organizations for promiscuous selling to outsiders might have a salutary effect, but it looks to me very much as though there was a disinclination to administering discipline to offending members lest such discipline might prove a refractory chicken and speedily come home to roost.

A JOBBERS' VICTIM.

New York, August 20.

The Balance Impulse Angle.



THE QUESTION of the magnitude of the balance impulse angle, says T. C. Scotchford, has a two-fold bearing, first, in regard to timing, and secondly, in regard to the mechanical provisions against stoppage in the escapement. It is clear that the locking resistance is proportionate to the impulsive force of the escape wheel; also that the rotary energy of the balance is proportioned to its mass and diameter, and therefore offers a proportionate resistance to the impulse.

If, with a large balance angle of impulse and a heavy balance, the latter is arrested at a point near the end of the arc, we have equilibrium, that is, the impulse moment and resistance of a balance spring are balanced—the latter always being proportionate to the magnitude of the balance in a definite ratio, it follows that the watch would easily stop.

We can get rid of this fault if we make the impulse moment in excess of the balance resistance, which can be done by either diminishing the latter or increasing the former. This can be accomplished by inserting a stronger mainspring or a smaller balance and a weaker spring, or by reducing the impulse angle, which diminishes the resistance in the same ratio as it increases the moment. Again, if the balance is arrested at a point where the unlocking is effected and we have equilibrium, it also follows that the unlocking resistance is in excess of the elastic force of the balance spring. We overcome this defect by diminishing the latter or increasing the former by means of a weaker mainspring or a heavier balance and stronger balance spring, or otherwise by increasing the impulse angle so that the locking is effected at a point where the elastic force of the spring is stronger.

Thus, in a lever escapement, in order that the watch may not stop, these ratios should be so adjusted that the watch will not be affected to this extent, no matter what force arrests the balance; that is, whenever the cause is removed the watch starts off spontaneously, without external shake or impulse. As to unlocking, the locking inclines should only be of such an angle as to insure the safe rest of the lever against banking. In the ordinary table roller action, which is the roller used in the escapement under consideration, 10° to 12° is sufficient.

Free Hand and Mechanical Drawing.

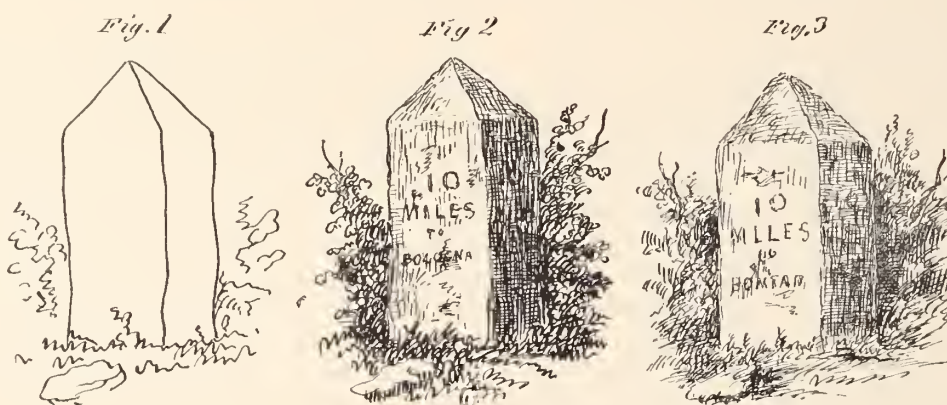
BY EXPERT.



IN TRACING up the art of drawing as expressed by lines, we discover a gradual growth in two directions, and these two broad distinctions modified again in detail by circumstances. I am speaking now of lines as used by engravers. Undoubtedly metal engraving with incised lines were first used, and these in a sense of ornamentation. It is not relative to the subject to follow the gradual advance of the art of engraving now, only as it has an influence on methods of expression by lines pictorially used. The first lines used in engraving capable of any great degree of excellence were those made by the graver, but even these were not in all respects what we desired

for pictorial use. We could produce lines which were straight or curved, as best illustrated by script engraving, with great facility; but irregular and broken lines were stiff and conventional. This led to the use of the so-called "dry point," a simple steel point used to forcibly scratch the metal. This instrument was hard to use and uncertain in action and led to etching, a process in which the metallic surface was covered with some waxy material which would resist acid and allow the steel point to trace lines freely through it. These lines to be deepened and enlarged subsequently by the action of some corrosive acid. These two methods were soon combined, *i. e.*, the hard conventional lines produced by the graver were used for certain effects, while the free and unrestrained lines of the etching needle was applied to those parts for which this style of work was best adapted. As, for instance, in an engraving of a landscape in which good sized and carefully executed human figures were shown; the landscape, including foliage, rocks, grass, foreground and distance, was all executed by etched lines. On the other hand the human figures were entirely produced by the graver. To show the influence exerted by habit and such methods of expression as was in use, we find even in early wood engraving the black lines crossed and hatched precisely as was then in vogue for copper plate engraving. It remained for such men as Berwick to break the trammels of custom and strike out a new system known as the white line method, and on this basis rests the art of wood engraving of to-day. To those persons who wish to read and study up this phase of the subject I would recommend *The Art Amateur* for March, 1885. In

Even sketching with water colors require a small host of conveniences; but the pen and ink artist needs only a tablet of paper, a bottle of liquid India ink and he is fixed. The same tools and material with which he could or would design the settings for Mrs. De Brown's ear rings, serves to portray the figure and pose of a dainty miss he sees on a visit to the park or a secluded nook in the same park. Hardly any place where rest and recreation are to be had that do not afford the person possessing the ability some felicitous subjects for sketching. At fig. 1 is shown a pen and ink outline of a mile stone, selected as about as simple a subject as possible to conceive for our purpose, being readily and effectively shown by mere outline, and also well adapted to be shown by the effect of contrasting lights and shadows as illustrated in fig. 3. Here we have the crude outline in fig. 1, and at fig. 2 a drawing in pen and ink imitation of a black line engraving, while fig. 3 is more in the manner of true pen and ink drawing. It is not the writer's intention to give examples of pen drawing to copy, for among his many faults and failings he has not the vanity to believe he has skill above hundreds of others. What he desires is to point out to the pupil the true method of expression with a pen. In pen practice, parallel lines (see fig. 4) are the great staple, and it is only after wasting quires of paper that we begin to understand how very difficult it is to make parallel lines of equal length and the same distance apart either horizontal, perpendicular or oblique. In practicing drawing with a pen, after you have acquired a certain dexterity in lines, it is better to copy from a photograph than from any pen artist's work.



this number is given two excellent specimens of black and white line in wood engraving. Another and much finer illustration of white line can be found in a small "Hand Book of Wood Engraving," published by Winsor & Newton, London. The illustration here is taken from Berwick's "Book of Birds." The reason why the writer has gone to this length in speaking of engraving is to arouse the reader's attention in avoiding mannerism. When photo-relief engraving first came out the inventors sought to make it a cheap substitute for wood engraving, and it seemed, as a natural consequence, the pictures or drawings executed in this way must look like wood engravings to become commercially valuable. Old artists already had adopted a style in pen drawing similar to etched lines; all our drawing books were illustrated by men who designed for engravers. It seems even yet we have not found the man who can entirely break away from the conventionalisms established by engravers and found a true school of pen drawing. In *The Art Amateur* for July, 1883, are some very fine specimens of pen drawing, especially the landscape by Lepère. Pen methods, also in the same number, is strongly flavored with engravers' methods, as is a facsimile of a pen drawing of Titian. This last mentioned example shows also the engraver's manner, and one who used the graver at that. I have, I hope, said enough to arouse a feeling in the reader to try and avoid as much as he can these peculiarities. There are few persons who would not like to sketch from nature, yet those who do not devote a great portion of their time to art seldom keep on hand the materials for drawings from nature with any satisfaction.

All you want of the pen artist is to get at his methods of expression, say, of trees. Most engravers have a conventional method of making trees, and for the life of you, you can not tell whether the tree shown is a maple, an oak or an ash. Now, the pen and ink artist should seek to tell with his pen whether a tree (if of any size) is an oak or maple, or, indeed, any species. Now, it is not by the shape of the leaves, for they would be too small to distinguish even the shape of a single leaf. It is by studying the habit, manner of branching, shape of the trunk, etc., which tells us to what species a tree belongs. In rocks it is the stratification and cleavage which gives us the idea of gneiss, slate or limestone. Bearing these features in mind try and express them, and if we properly feel them, as a rule, we will convey something of the same impression to others. Many artists use a species of card board called "enameled board" to make pen and ink drawings upon. The advantage of this is we can break up a dead flat shadow. But to understand this we must describe enameled card board. It is made of a rather inferior stock not quite white; to conceal this it is covered with a coating of some white pigment, usually some form of white lead, but in some instances a white earth is employed. In using such board the pen works very freely, producing a line of peculiar evenness—indeed much evenner than on the finest Bristol board. One of the weak points in pen drawing is intense shadows. We darken and darken a shadow with a pen by repeated cross lining and it gets spotted, and our best efforts convey no idea of form; the shadow only gets spotted, and all attempts to get clear obscure (*claire obscura*) effects in shadow are sorry failures.

But with enameled paper we can actually paint over the deepest shadows with a solid India ink black, and, after it is dry, with a keen sharp knife scrape off the coat of black to break up monotony. We can in this way greatly relieve some parts, but the true way is make your shadows so they do not need it. Practice shadows in which the form of objects are preserved, but not hard and obtrusive.

The Use of Shellac in Horology.

[By H. H., in *Deutsche Uhrmacher Zeitung*.]



FRENCH horological journal, some time ago, contained a query asking for a proper method of fastening either the pallets, or imparting to the corresponding metal parts the required temperature without fearing to exceed the proper degree of heat—either directly with shellac or else by the use of some special small tool. Although this query appears to be trifling, as nothing more simple can be imagined than the fastening of a jewel in the hole with shellac, it is well known by experience that it is not by any manner as easy as might be imagined, and that this job, and also its durability as practically executed by many watchmakers, who leave the intermediate parts daubed over with shellac, leaves plenty of room for improvement. I believe, therefore, that I do not intrude by specifying a well tested method for performing this piece of work.

The shellac is for the watchmaker a very desirable cement, and for the several pieces of work, hereinafter detailed, it has become almost indispensable. We use it principally for fastening the impulse jewels of anchor watches, or the unlocking or detent jewels of chronometers, for the pallets of the anchor, etc. If we wish to claim with certainty that the jewel is securely fastened, it is unconditionally necessary that it fits precisely in its hole or notch. The jewel should actually be fitted in previously in such a manner that it is retained in the aperture without the use of a binding agent, and simply by the friction of the planes lying precisely upon each other. Pallets that are either too thin or too small for the anchor or chronometer forks, or impulse jewels, either too thin or not corresponding in size and shape to the hole for which they are intended, can never be fastened securely for any length of time, and an escapement fitted up with such faulty parts can never be relied on for an exact rate. Timers will save both time and vexation by closely inspecting this state of affairs before expending any labor on the balance or spring. Before the jewel is cemented in, it is unconditionally necessary to clean the parts—the jewel as well as the part of the escapement where it is to go—from every trace of oil and old shellac. For this purpose lay them for a while in good strong alcohol, which dissolves the old shellac. Then clear the jewel carefully by rubbing it with a rag laid over the point of the finger. The aperture to receive the jewel must in like manner be cleaned well with a properly cut pegwood. By finishing this operation by washing with soap and water, you simply improve the condition of these parts, and it will not injure them at all. After they have been thoroughly cleaned and dried, the cementing can begin. For this I would advise to use a simple and easily made tool, as described below.



Cut a strip of fairly heavy brass, about 2 mm. (0.08 inch) thick, 15 mm. (0.59 inch) broad, and about 10 to 12 cm. (3.94 to 4 inches) long, hammer it flat, and make it smooth. About 3 cm. (1½ inches), from one end fasten with a screw a revolable bridge or clamp of equally heavy brass. Accompanying cut will assist in more clearly showing the disposition of the tool.

Let us suppose that we have an anchor with visible pallets to fasten. For this purpose take the tool, and by means of the bridge or clamp fasten the anchor upon the plate. Two or three small steady pins, which have been for the purpose located upon the face of the tool, will prevent the lateral displacement of the anchor. Then heat the tool above a flame. A small piece of shellac, laid upon the plate will, by melting, indicate the degree of heat not to be exceeded. Now take a piece of good shellac, draw it into a thread by heating it above the flame, and let some of it run into the two apertures intended for the reception of the jewels in the anchor. Next take the jewels, which were also laid, for the sake of heating, upon the plate, and which, in order not to exchange them, were each laid near its proper hole, and mount them in place. So as to be certain that each jewel is well fastened, draw it in and out before the cooling of the shellac, to distribute this well in all parts of the hole. When the shellac has been well divided, and you are certain that everything is to satisfaction, remove the plate from the flame. The shellac remains fluid until the jewels have been adjusted with precision. Let the plate cool off, and remove the anchor to clean it from the shellac sticking to the outside. For this use a brass center, filed three-cornered, and by means of a slight pressure and scraping the useless particles of shellac will easily come off. The anchor is finished cleaning by the use of a properly cut pegwood, dipped in alcohol, and finally with elder pith, dipped in the same fluid leaving the polish intact. I must also mention that under no circumstances is the shellac to be heated beyond its point of melting. Higher degrees of temperature would simply burn and rob it of its characteristics as binding agent. All horizontally inserted jewels can in this manner be easily and very securely fastened.

The repairer will at once recognize the merits of this tool, and that it is very useful for attempting corrections of the anchor by means of displacing the pallets, to make it wider or narrower, to give it more draw, etc. The heat of the plate lasts for some time, and, once heated, it may be laid upon the bench. This frees the two hands to undertake the precise placement of the jewels in the anchor, which is held in position by the clamp or bridge and between the steady pins.

The manipulation for fastening the jewel in the impulse roller is somewhat different. To accomplish this, fasten the roller with a small strip of paper in the sliding tong (or claws) in such a manner that the opening for the jewel comes to the outside; lay the front part of the tong, accompanied with a piece of shellac, upon the plate, and hold it at about the center over the flame. As soon as the shellac begins to run, take the tong away. Then fill the hole for the jewel with shellac in the above specified manner, mount the jewel and draw it to and fro several times for the purposes mentioned, and leave it in its precise spot. The cleaning is similar to that above described.

I have seen shellac in a fluid condition recommended for cementing, but my experience is that it is not as good as my method above described, because some time is required until the alcohol evaporates, and until this is done the position and security of the jewels are in jeopardy.

Color in Electro-Gilding.



CONTEMPORARY says that it is of the greatest importance to possess the knowledge of the art of regulating the current and general working of hot electro-gilding liquids, so as to make the process useful in producing not only deposits of gold, but those of any desired color. As a general rule, it will be found best to obtain excessive color by additions to the bath, and not by attempting to work it up to this by the current or temperature. Thus, to obtain a red or green gold of decided color it will be necessary to

make additions of acetate of copper and nitrate of silver. But if it is not required to perpetually gild in this color, or at least until all the added metal is worked off, the bath will be spoiled for ordinary gilding. It is, therefore, always wiser, when excessive color is required, to either make up a separate solution for that particular color, or to make the main bath up in that manner, if the work is always to be carried on.

To make a bath for red gilding, grind a little of the acetate of copper (crystallized) to powder, dissolve in water, and add to the bath, with stirring, every evening, as much as may be required. In a new bath, where there will be no troublesome sediment to disturb, the addition can be made at any time and the quantity augmented if the color is not sufficiently deep. It must not be forgotten, however, that gold so colored is not so fine as yellow gold. Attention should be given to some of the directions which follow, so that the battery power and temperature may be regulated to assist in the production of deep color, it being important that too many foreign substances be avoided in a good bath.

To obtain green and white gilding, the addition is a solution of the crystallized nitrate of silver. This is added in the same way as the copper. A very little (a few drops) will generally produce green gilding, and a little more white.

To deposit a gold of pink appearance is a more troublesome matter. The surface is first coated yellow, and then thinly red, and over this is produced an exceedingly thin coat of silver in a silvering solution. Such surfaces are very lasting, and should be burnished.

A good cyanide gilding solution should be of sufficient strength to allow of its producing from a pale and poor-looking deposit to a deep and nearly red rich gold. For such purposes the solution may even contain as much as 1½ ounce of gold per gallon, but beyond this it is not advisable to go, for the reason that the paler tints are not readily obtainable. The poorer solutions will produce fairly pleasing tints when the current is strong and the temperature high, but the darker shades are apt to have a dingy appearance, instead of that mellow and clear surface which is the chief aim of the practical gilder.

A dead gilding will be produced by the addition of a little of the fulminate of gold in solution to the bath immediately before gilding, or dip the articles (brass and copper) before gilding in a mixture of sulphuric and nitric acid.

Automatic Clock for Railroad Cars, Cabs, etc.



NO SERIOUS attempts have hitherto been made to introduce clocks into railroad and horse cars, cabs, etc., very probably for the all-sufficient reason that the attendance would be so faulty as to render the timepiece virtually useless. The invention made by Mr. A. Bourgeois-Weber, of Biella, Switzerland, and illustrated in the *Deutsche Uhrmacher Zeitung*, however, appears to not require the assistance of human hands, but effects its own winding automatically by means of a peculiarly suspended pendulum intended to overcome the negligence of the railroad, etc., attendants. This wagon clock winds itself in 24 hours while the car, etc., is in motion, and with this winding runs for 12 days; keeps on going, therefore, provided the car, etc., does not stand still for more than twelve days, which is only exceptionally the case.

Fig. 1 of the accompanying cuts represents the clock train, the winding arrangement of which is actuated by a vertical pendulum without spring, and which oscillates freely with stronger or feebler motion, according to the jars and tremblings of the vehicle.

Fig. 2 shows the dial corresponding to the mechanism.

Fig. 3 represents in diagram and section the wheelwork of the tension indicator.

The equal parts in the different figures are designated by equal signs.

The clock with automatic winding arrangement is an ordinary clockwork, consisting of the barrel, the wheel *B* of which gears into the pinion of the wheel 1; of the center wheel 2, the pinion of which also depths with the wheel 1; beside this of the wheels 3 and 4, the cylinder wheel 5 and the cylinder 6; finally of the motion work wheels 7 and 8 underneath the dial.

The push pendulum *P* shows no peculiar construction; it carries a small push spring *a*, which at each jar of the car, etc., pushes the wheel *C* one or more teeth forward. The return motion of the ratchet wheel is prevented by a second click spring *b* which is fastened to the bridge *X*.

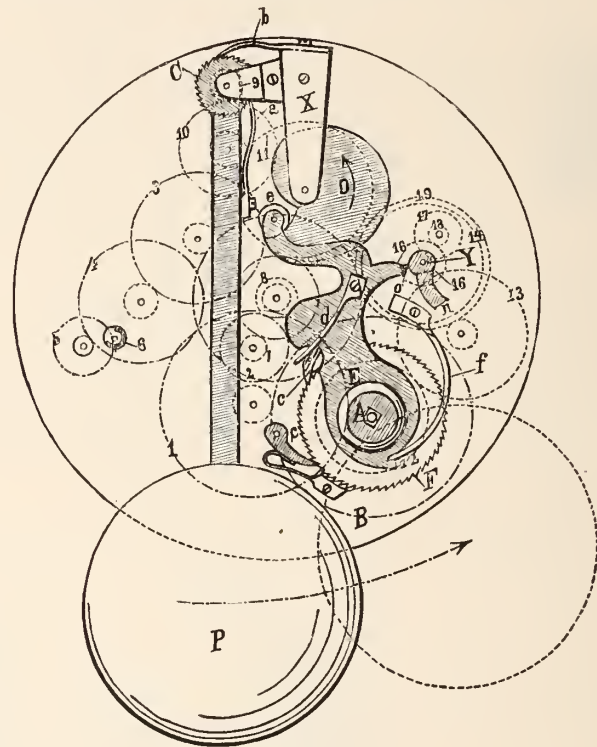


FIG. 1.

The axis of *C* carries a follower *g*, which actuates the eccentric *D* by means of the wheel 10, the pinion of which depths into the wheel 11 fastened upon the axis of *D*. When the eccentric *D* turns in the direction indicated by the arrow, it lifts the end of the lever *E* provided with a collet *c*. This peculiarly shaped lever *E* driven by the assistance of the click *c*, influenced by the spring *d*, the ratchet *F* which is fastened upon the spring axis *A*. The return motion of the ratchet *F* is prevented by a second click *c*.

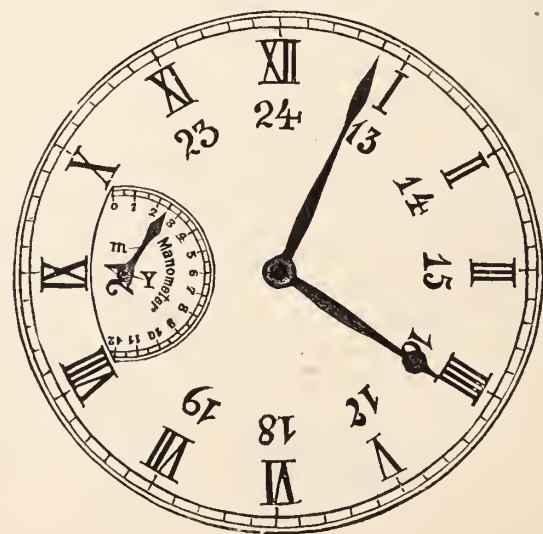


FIG. 2.

When the collet *c* has arrived at the highest point of *D*, it falls under the influence of the spring *f* back upon the lowest point of *D*, and then again lifts the lever *E* in order to effect the winding of the clock spring by a renewed rotation of *F*.

So as to be able to see at any time how far the clock spring has

been wound, and as, besides this, it is also necessary after the spring has been wound fully, to stop the action of the winding arrangement automatically, the clock is provided with a tension indicator, the hand of which shows at any time for how many days the clock is still wound, and beside this with a stop arrangement, which causes the winding arrangement to suspend operation whenever the spring has been fully wound. The wheelwork for producing these two effects is plainly visible in fig. 3.

Upon the axis *Y* of the tension indicator are fastened the hand *m* and the projection *n*; the former indicates upon the dial the number of days for which the clock is still wound. The axis *Y* is moved either in one or the other direction, in such a manner that the hand advances from 0 to 12, when the mainspring is being wound more than it runs down, which will be the case every time when the joints become frequent, or, in the contrary case, when the winding apparatus functions no longer, which is the case if the car, etc., containing the clock stands still.

The wheel 16 is fastened upon the axis *Y*. The wheel 14 depths into the tothing of the barrel *B*; its pinion 15 gears into a differential gearing 17 and 18, the axis of revolution of which is fastened upon the wheel 19. The spring axis *A* carries a wheel 12, which gears into the wheel 13, the pinion of which moves the wheel 19. The follower 18 of the differential gearing propels the wheel 16 fastened upon the axis *Y*.

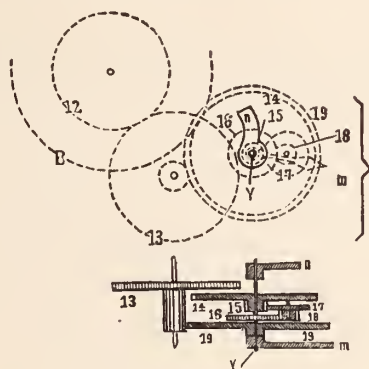


FIG. 3.

This arrangement permits the barrel *B* to move freely the hand *m* by means of the wheels 14, 15, 17, 18 and 16, even when the winding arrangement stands still, that is, if the wheels 12, 13 and 19 are stationary, which is the case between two oscillations of the pendulum *P*, or when the car, etc., remains stationary. The motion of the projection *n* corresponds to the motion of the hand *m*.

The proportion between the number of oscillations of the pendulum *P* and the length of the spring to be wound, of course, can be optional; the following proportion, however, has practically demonstrated itself to be reliable.

Twelve full oscillations of the pendulum *P* were adopted for one entire revolution of the ratchet *C*. Furthermore, 21 revolutions of *C* corresponded to one entire revolution of the eccentric *D*, for the purpose of one up and down motion of the lever *E*. Finally, 29 up and down motions of the latter were allowed for one revolution of the ratchet *F* (that is, for winding the spring one revolution) which corresponds to a going of 33 hours of the clock.

By using these proportions, the trials made with such a clock hung up in a railroad car going at a medium velocity, have resulted in the winding for 60 minutes of the spring, to store up sufficient energy to keep the clock going for 12 hours.

The Influence of Equinoctial Storms on Mainsprings.



FEW PERSONS, says Prof. A. C. de Lara, who have had the care of a collection of watches, such as accumulate on a watchmaker's bench, can have failed to have noticed that there must be some specific cause for the breaking of an unusual number of mainsprings at about the same time. Supposing a watchmaker had a hundred

watches of various makes belonging to customers which he winds and regulates every day.

On a certain morning, especially during the latter part of March and September, after winding five or six he comes to a broken mainspring, of which the watch is half run down. The chances are that if he finds one so, there will be three or four more in a similar condition. Nor does the coincidence end here. Any watchmaker who has one hundred watches on his bench has five hundred in the pockets of his customers, and before night five or six more with broken mainsprings will be brought in. Now, what is a natural conclusion from a consideration of these facts? There can be only one, and that is, some unusual force must have been applied to influence the breaking at the same time of so many springs situated under such a diversity of circumstances.

What this force is is a subject worthy of investigation, and to investigate properly requires an intimate knowledge of all the factors involved in the matter. We know that preceding and during storms strong electric and magnetic disturbances prevail, also that we have what are called magnetic storms, which are unknown to us, except through delicate mechanisms made especially to render such phenomena perceptible. How such magnetic storms may affect cohesion under tension is one of the problems to be solved.

The mainspring is a strange and unaccountable bit of steel, and any one who has seen one broken into thirty or forty pieces in a barrel, or, in some instances, in the band in which it comes from the spring maker will, I fancy, feel backward in advancing any theory to explain the cause of the accident.

About the time of the vernal and of the autumnal equinoxes, the 21st of March and of September, there is an unusual number of storms, and consequently of magnetic and electrical disturbances in the air; but how they influence the mainsprings of watches to such a degree as to break them is at the present time an unsolved problem. That, however, the cause will elude well directed research is not to be thought of. It has baffled us hitherto, but there is no doubt that with the improvement in horological knowledge which we are daily making the truth will ere long be discovered.

The principles involved are of more importance than the cost of a few thousand mainsprings, for the breaking of steel under tension by a force only at times sufficiently strong enough to do so is a question involving the safety of steel rails as well as of mainsprings. The method of procedure in an investigation is difficult to determine, but it seems from the evidences we have mentioned that some cause coincident with storms attends the breaking of mainsprings. What this is and how this acts is what we are to ascertain.

The savants of Europe and America have stations for observing magnetic storms and disturbances. At Madison, Wis., is an observatory for this purpose, and at all hours of the day and night an attendant notes any perceptible magnetic changes in the air. It is well known to these observers that solar spots and phenomena have a great influence on the earth's magnetism. A record should be kept by leading watchmakers of the breaking of mainsprings, especially those which seem phenomenal, and the notes should be compared with those of various kinds of magnetic storms and disturbances, as we may in this way gain a clue by observing what is characteristic of the storms in which most of the breakages occur. It would also be well to subject special springs to a high degree of tension (very close to the breaking point), and while in this state bring to bear on them magnetic and electrical influences similar to those attendant on storms.

A series of experiments in this direction would be of considerable value, and might result in a final settlement of this much debated question.

Tramping Clock Tinkers.

"All the old lays are played out and it takes an artist to live fat like we used to. I really believe the chickens roost higher than they

did in the good old days. Oh, times is getting awful!" The fellow retired to a cave of gloom, metaphorically speaking, as he gave way to the flood of memories of the time before tramp business had been prostrated by over-production. "A man has to either steal or work some fake, like mending umbrellas or mending chiney—that's about as handy as any.

"Oh, there ain't much to it. All a man's got to carry is some samples, which must be straight, and some Persian cement—glue, water or anything to hold the dishes together till the man gets out of the neighborhood. You tie up the dishes with string and tell 'em that they must let 'em alone at least twenty-four hours to dry, which gives you time to skip. I run out of glue water onct and I cemented my dishes together with molasses, which I got out of a farmer's pantry. It was pretty much the same.

"Cleaning clocks is another good fake, only it has been worked to death. One of us goes ahead and tinkers up the clock, taking it partially to pieces, tickling it up with a feather and anointing it with ile or lard or something. I always, when I'm on the tramp, carry boa constrictor ile or yak ile for the purpose. It's coal ile or lard, ju-t as it happens. When I comes to put it together if I don't know exactly where all the wheels go I do the best I know how, and if there is any overflow of wheels without holes to put 'em in, as is usually the case, I jest quietly slip 'em in my pocket. I then hand-spike the hands ahead a half-hour and tells the folks it is unhealthy to turn them back and that they had better wait until the time comes as pointed by the clock before they start it running. This saves dis-arrangin' the innards, I tells 'em. That half-hour lets me out, and I goes if the clock don't."

The Manufacture of Mosaics.



ONE OF THE very few industries of Rome is the manufacture of mosaics, the largest establishment being under the control of the church and employed almost entirely in the adornment of churches and religious establishments. The process of making a picture in mosaic is very slow and requires the highest order of skill. To begin with, mosaic is made of glass, and its value consists in its being indestructible. The workmen in great pictures have to have something over 27,000 shades of colored glass to produce the tints requisite, as in a mosaic every color is necessary the same as in an oil painting. To make a picture the process is this: A plate of metal of required size is surrounded by a raised margin an inch in height. A mastic cement of powdered stone, lime and linseed oil is spread over the bottom of the plate and that covered with plaster of paris to the level of the rim. Upon this the picture to be made is very carefully drawn, and the mechanic's work commences. He takes a piece of glass of the exact tint necessary and fits it to its place, grinding it, to get the shape. Then he goes on, one piece at a time, till the picture is finished, then the face is ground down to a smoothness and the picture is set in its place.

Some of the greatest pictures of ancient and modern times are in mosaic, the tints, with all the delicate shades, being as carefully reproduced as in oil, and the effect being even greater. The ceilings of many of the great churches are entirely of mosaic, as well as many of the great altar pieces and other decorations. As they are utterly indestructible and never lose their color, they are very much prized. A picture in mosaic costs; but then it is eternal, barring fire and earthquakes.

All over Rome are small shops devoted to the manufacture of mosaic table tops, box covers, etc., the workman toiling all his life on one subject. The man who commences on St. Peter's, on table tops, or the Colliseum, never does any other subject, and he becomes so skillful in this one subject that he is enabled to make them not

only well but very cheaply. He has only the tints to manage that enter into the one picture, and he places them mechanically and very rapidly.

Cleaning Clocks.



THE CLEANING of large clocks, says J. Stader, in *Deutsche Uhrmacher Zeitung*, is frequently a source of great annoyance and consumption of time for the repairer; this job can essentially be expedited by using a few chemical agents and the following method:

Prepare a warm caustic lye by dissolving 1 part by weight of caustic potash in 20 parts of water. Tie all the wheels, levers and plates together with a thin wire, and suspend the bundle for 5 or 8 minutes in this lye, whereby all the fat and dirt, even of the most obstinate kinds, will dissolve at once; when everything is clean, rinse the scoured articles in water, and dip them in a solution of 1 part by weight of cyanide of potassium and 20 parts water, an operation which must not last longer than 2 or 3 seconds, and stops the dimming of the brass parts that might ensue in consequence of being scoured. Then rinse in hot water and dry carefully in sawdust.

After the articles have with a clean brush been freed from all the adhering particles of sawdust, it will be found that the movement looks like new, and even the original luster is restored, without the most trifling injury to the polish. In the cleaning of the holes barely a tinge will be found on the pegwood, and the cutting and rounding of the teeth will look as if but recently done.

Let none of my colleagues think that this is a tedious job; indeed, it can be done in a quicker time than it takes to write it down. The use of cyanide of potassium is not injurious whatever, if prepared and used according to prescription.

Mystery Gold.



AT THE present time a considerable amount of jewelry made of this alloy is believed to be manufactured, chiefly with the object of defrauding pawnbrokers to whom it is offered in pledge; and as it will stand the usual jeweler's test of strong nitric acid the fraud is often successful. The article examined was a bracelet that had been sold as gold to a gentleman in Liverpool.

The alloy, after the gilding had been scraped off, had about the color of 9 karat gold. Qualitative analysis proved it to consist of platinum, copper and a little silver; and quantitatively it yielded the following results:

| | |
|-----------------------------|-------|
| Silver..... | 2.48 |
| Platinum..... | 32.02 |
| Copper (by difference)..... | 65.50 |

100 00

Strong boiling nitric acid had apparently no action on it, even when left in the acid for some time.—*W. F. Lowe, Chem. News.*

Silver in the Melting-Pot.

"In the old days," says Col. Snowden, "heaps of family silver used to come to the Mint to be melted down from people who had met with financial reverses. During the last days of my incumbency of the office of Superintendent much less used to come than formerly, because plated ware had come into general use. I remember once

that a gentleman very well known in Philadelphia society brought me a splendid design in silver that he desired to have reduced. It was a gift to his wife on their wedding, and the thought of parting with it was very painful to him. It had cost probably \$2,000, but there was not more than \$300 worth of bullion. Instead of melting it at once I advanced him the money for six months, and allowed the design to remain in the vaults. At the end of that time I agreed to keep it intact for six months more. At the consummation of the second period he saw me and said he could not see daylight yet, and the bridal gift went into the melting-pot. Three weeks after that he dropped in on me to say that fortune had smiled on him again and that he had made \$50,000. He said he would have given half of it to get his silver back in its old form. Vain regrets, of course. The man is now wealthy."—*Philadelphia Press*.

Increasing Demand for Iridium.



IRIDIUM IS A metal which is likely to have a much more extensive employment than it now enjoys. Hitherto it has been chiefly used in alloy with osmium for tipping gold pens. But an American pen manufacturer has discovered that by fusing the metal at a white heat and adding phosphorous perfect fusion could be obtained, with all the hardness in the resulting material of the iridium itself. For mechanical applications this combination is exceedingly useful, as in the case of pen points; and its adaptability is being proved in many ways. Agate, which has hitherto been employed for fine chemical balances, is now giving place to iridium, which takes a finer edge and is not so liable to catch or break.

Hypodermic needles for surgical use are now made of gold and tipped with the iridium compound, which is not subject to corrosion like the old steel points, and it is also being largely applied to instruments for surveyors and engineers and to electrical apparatus. Iridium can be obtained, somewhat abundantly from the Russian platinum mines in the Ural, and it is found in combination with gold in California. Mr. Dudley, of Cincinnati, is engaged on experiments with the object of plating vessels with iridium, and as the metal resists the action of acids, it is likely that such vessels will be very useful in many chemical operations.—*Chem. and Drug*.

Swiss vs. American Watches and Ribbons.



THE SWISS manufacturers are again excited over the decrease in their ribbon exports from Basle, and the watches from Chaux-de-Fonds to the United States during the year 1885. The watch export has declined 50 per cent. as compared with the year 1884. In regard to the ribbon export it is said that were it not that fashion is too variable for the American manufacturer to keep up with, it would show a greater decrease than that of the watch trade.

The watch industries of the United States seem to be destined not only to supply our home wants, but at no distant day to overflow the outer world. We know of no other industry wherein the taste, aptitude and mechanical genius of our people can find a better field, and the fact that the head and front of these Swiss industries begin to feel the pressure of our home manufacture should be highly appreciated by not only the manufacturers engaged in the pursuit, but by the whole American people, for such industries are not only calculated to enlarge the general prosperity, but they are also calculated to enlarge public taste and culture.

It is fortunate for our watch industry that fashion cannot confuse and confound the trade, or rather, that Europe cannot dictate style,

and so maintain an advantage over us, as is the case of fancy ribbons. Our silk manufacturers will always work under disadvantage while Europe dictates our fashion; but this dominion is not extended over the watch manufacturers, and in this field and for this reason we will always be ahead of Europe.

How the Tax on Travelers Works in Some States.



A COMMERCIAL traveler who sells most of his wares in the South, says it is a risky matter to go down South now and sell without a license. Even in Washington three drummers were fined \$200 each last week because they did business without a license. At some points it is a State law which confronts the traveling salesman, and at others a city or town ordinance requires a license.

"The last time I was in Charleston, S. C.," said the traveler, "a smart chap, with a touch of the Hebraic in his dialect, tapped me on the shoulder and asked me if I was a commercial man. I said I didn't think it was any of his business. He turned back his coat and showed a badge as municipal detective, and said there was a city license of \$10 to pay for soliciting trade. I told him I didn't know that I was going to do any business in Charleston; I was there to see the city and some old acquaintances. He went off not well satisfied as I could see. I knew he was watching me and I gave him a good tramp, went down to the front of the city, inspected the Calhoun monument and incidentally dropped into two or three business houses. Toward night my acquaintance overhauled me again and suggested that it would be well for me to take out that license. I said to him: 'See here, I'm not going to drum the city, but there are two or three places where I can sell bills of goods and then I'm going to get out. These people I deal with are old customers of our factory. There won't be anything said about my business here. You take this and we'll let that license drop.' I tucked a \$5 bill in his hand; he winked and went off. Saved just half on the license there you see.

"Now, in New Orleans," he continued, "we've still another scheme, and it's good to save \$50, which is the tax on soliciting trade there. I go to the hotel and have my cases sent to the room. In the course of the day I walk around and say 'how are you' to my customers, chat about the exposition and go out. Just as I leave the customer says: 'When will you be in at your hotel.' I set the hour, the customer comes round and sends up his card. The boy is told to show him up, the key is turned in the door and we get down to business. Of course," concluded the traveler, "it takes discretion to work these rackets. In Charleston, two days after I left, a New Yorker undertook to bluff my detective friend, was hauled up in court and fined \$150, which shows that something besides cheek is requisite to be a successful commercial man down South."

About Replacing Pinions.



THE FOLLOWING answer to a query in one of our horological exchanges affirms substantially our view that the genus botch is pretty well distributed throughout this globe. The answer is self-suggestive of the import of the query. It says:

The queryist appears to be astonished that his watch, after he had replaced the 6-leaf pinion of the scape wheel without other alteration by a 7-leaf, without at the same time mounting a fourth wheel with more teeth, goes much too fast—a fact which, according to the simplest laws of mechanics, could not be otherwise. As the old pinion

of the escape wheel was a 6-leaved one, the fourth wheel had 60 teeth, and the watch, made according to the old arrangement, 18,000 vibrations per hour, at which it rendered a satisfactory rate. But when queryist mounted the 7-leaf pinion, the watch made only about 15,400 vibrations per hour (not taking into account the fractional parts), and consequently it now gained about 2 hours 45 minutes per 24 hours. The advancing of the watch, in place of excessive overloading of the balance, could by queryist have been corrected simply by a weaker balance spring; but since such slow vibrations are objectionable in a watch for several reasons, it is advisable to re-institute the old arrangement of 18,000 vibrations, and queryist can do this by simply putting in a fourth wheel with 70 teeth, together with his 7-leaf pinion. It is self-evident that if the pinion fits to the present fourth wheel with 60 teeth it will be too large for the new wheel.

There are still a few more of the same sort left.

To Imitate Inlaying of Silver.



VERY NEAT imitation of silver inlaying for small boxes, handles, and articles *de luxe*, may be made in the following manner: Carefully draw your pattern upon the work, and then engrave or cut away your lines with sharp gouges, chisels, etc., so as to appear clean and even, taking care to cut them deep enough, and rather into it, like a dovetail, so as to secure the composition afterward to be put into the grooves. The silver composition may be made as follows: Take a small quantity of the purest and best grain tin and melt it in a ladle; add to it, while in fusion, the purest quicksilver, stirring it to make it incorporate; when you have added enough, it will remain as a stiff paste; if too soft, add more tin, or, if too stiff, add more quicksilver. Grind this composition in a mortar or upon a marble slab, with a little size, and fill up the cuttings or grooves in your work, as you would with putty. Allow it to remain some hours, to dry, after which you may polish it with your hand, and it will appear like work inlaid with silver.

Metals More Valuable Than Gold.



THE *Colliery Engineer* gives the following as the names of those metals valued at over \$1,000 an avoirdupois pound, the figures given representing the value per pound:

Vanadium—A white metal discovered in 1830, \$10,000.

Rubidium—An alkaline metal, so called for exhibiting dark red lines in the spectrum analysis, \$9,070.

Zirconium—A metal obtained from the minerals zircon and hyacinth, in the form of a black powder, \$7,200.

Lithium—An alkaline metal; the lightest metal known, \$7,000.

Glucinum—A metal in the form of a grayish-black powder, \$5,400.

Calcium—The metallic base of lime, \$1,500.

Strontium—A malleable metal of a yellowish color, \$1,200.

Terbium—Obtained from the mineral gadolinite, found in Sweden, \$4,080.

Yttrium—Discovered in 1828, is of a grayish-black color and its luster perfectly metallic, \$4,080.

Erbium—The metal found associated with yttrium, \$3,400.

Corium—A metal of high specific gravity, a grayish-white color and a lamellar texture, \$3,400.

Didymium—A metal found associated with cerium, \$3,200.

Ruthenium—Of a gray color, very hard and brittle, extracted from the ores of platinum, \$2,400.

Rhodium—Of a white color and metallic luster and extremely hard and brittle. It requires the strongest heat that can be produced by a wind furnace for its fusion, \$2,300.

Niobium—Previously named columbinum, first discovered in an ore found at New London, Connecticut, \$2,300.

Barium—The metallic base of baryta, \$1,800.

Palladium—A metal discovered in 1802 and found in very small grains, of a steel gray color and fibrous structure, \$1,400.

Osmium—A brittle, gray-colored metal, found with platinum, \$1,300.

Iridium—Found native as an alloy with osmium in lead-gray scales, and is the heaviest known substance, \$1,090.

The Value of Coral.



THE VALUE of coral depends on its color and its size. The white of rose-tinted variety stands in highest popular esteem, perhaps chiefly because it is rarest. It is mostly found in the Straits of Messina and on some parts of the African and Sardinian coasts. The bright red coral, in which the polyps are still living when it is fished up, stands next in value. Dead coral has a duller tint, and is consequently sold at a lower price. Two entirely different substances bear the name of black coral. One of them is not, properly speaking, coral at all, and is commercially worthless, as it breaks into flakes instead of yielding to the knife, although it is often sold as a costly curiosity to foreigners. The other is the common red coral, which has undergone a sea change, probably through the decomposition of the living beings that once built and inhabited it. It is not much admired in Europe, but in India it commands high prices, so that large quantities of it are exported every year. These are the four important distinctions of color, though they, of course, include intermediate tints which rank according to their clearness and brilliancy. The size is a still more important matter. The thickness of the stem of the coral plant, to use the commercial and entirely unscientific expression, determines its price, and many a branch of red coral is valued more highly on account of its thickness than a smaller piece of the choicest rose color. The reason for this is clear. A large straight piece of material can be worked to advantage by the artificer; a crooked one, if it be bulky enough, can at least be turned into large beads; mere points and fragments can only be used for smaller ones, or made into those thorns which are said to be invaluable against the evil eye, but which do not command a high price in the market, perhaps because it is overstocked.

NEW ALLOY OF ALUMINUM.—The applications of aluminum are now considerable, and M. Bourbouze, a French physicist, has added to their number by employing an alloy of the metal with tin for the internal parts of optical instruments in place of brass. The alloy he employs consists of 10 parts tin and 100 parts aluminum. It is white like aluminum, and has a density of 2.85, which is a little higher than that of pure aluminum. It is, therefore, comparatively light, which is an advantage for apparatus where lightness is desired. It can be soldered as easily as brass without special means, and it is even more unalterable to reagents than aluminum. The attention of electrical instrument makers should therefore be called to it, especially for apparatus of a portable character.

Foreign Gossip.

MOUNT HAMILTON OBSERVATORY.—The contract for mounting the great Lick telescope at Mount Hamilton Observatory has been awarded to Warner & Swasey, of Cleveland, for \$42,000.

THE AGE OF A WATCH.—It has been estimated that the average life of a watch is five years, and that during that time 5,000,000 watches are made and sold. In former years, before the labor-saving machinery now so extensively used was invented, the annual output for each man employed was fifty watches; now, with the help of machinery, each man employed at the business is enabled to turn out one hundred and fifty watches annually.

THE GREAT LICK TELESCOPE.—The great Lick telescope, when mounted and swung against the sky, will have a focus of fifty-five feet in length, and nearly fifteen longer than the largest one ever made. It will be a refractor, which means that the image is formed directly to the eye by the object glass, as contra distinguished from the Gregorian and Herschelian telescopes. The largest telescope ever known of the latter style was Dr. Herschel's. The tube lacked but eight inches of being forty feet in length.

A SOLAR CLOCK.—A prominent watchmaker in Rio Janeiro has a solar clock fitted up in his establishment which is not only ingenious but practically solves the question of perpetual motion for those places where the sun shines perpetually. He has an electric-bell apparatus in the upper story, and the two wires from the battery are furnished each with a thin, flat horizontal piece of metal, separated by a distance of four to five millimeters one from the other. Just above the flat pieces of metal a bi-convex lens concentrates the rays of the sun upon them at a certain moment, noon, for instance. The action of the sun's rays heats and bends the metal pieces so that they come in contact, thus closing the electric circuit, which rings the bell. This is not all that Mr. Magnin required of the sun; he forces it to wind up the clock in his own room at the same time. The barrel arbor carries a click and a ratchet, which is wound up by the hammer of the electric bell as it moves forward and backward, striking the hour. And even this is not all—this sun has to regulate the clock also. The canon carries a washer with an indentation corresponding to a jointed lever, which is set in motion by the armature of a magnet, and at noon turns the canon so as to bring the minute hand upon the figure twelve.

GOLD MINING IN INDIA.—The extreme stagnation that for years prevailed in Indian gold mining has at last been broken up by a great rush of speculative business. Hitherto Indian gold mines have only absorbed capital and given no return to the shareholders. Between 1879 and 1881 about 30 gold mining companies were floated, with a capital of \$15,000,000. There was quite a mania for these properties, but as the gold found cost more to produce than it was worth, the bubble soon burst. Most of the companies went to the bottom very quickly, and until recently the few that remained seemed in imminent danger of foundering. Now, however, Indian gold mines are again in favor, and people are as eager to invest in them as they were in 1879. The change has been brought about by favorable official reports of the crushing of quartz at the Mysore Company's mine in the Colar district. The depth of the mine is over three hundred feet, and a rich ore, containing from four to six ounces per ton, it is stated, is being obtained. Accordingly, the shares, which lately stood at ten dollars each, rose to thirty-five, or to a premium of six hundred per cent. The shares of other companies in the Colar district have jumped up and down, and have been the shuttle-cocks of Exchange speculators. It is difficult to get at the truth regarding the worth of these mines. Certainly, the official reports look promising enough, but official documents are not always to be trusted, and the mining market is treacherous above all others.

STREET CARS IN PARIS.—In Paris the street cars belong to the city, and in New York the city belongs to the street cars—at any rate to their drivers and conductors.

ROYAL RELIQUES.—A valuable collection of art articles, the history of which is closely allied with the "house of the Hohenzollerns," will shortly be offered at auction in Berlin. Among other objects is one of those artistic snuff boxes of Frederic the Great which he used to present, filled with ducats, to his generals. The cover, beside the Black Eagle and the golden star, bears the legend: "Dieu vit et Frédéric notre héros," (God lives and Frederic our hero), surrounded by a laurel wreath, it bears the names of the battles fought by him from Mollwitz to Zorndorf. Engraved upon the right side are the words, "Vive le roi de Prusse Frédéric le grand," and upon the left side, "Honnay soit qui mal y pense." Another snuff dose of the same period is remarkable for its history. Although this great king used to bestow these doses only to generals and ambassadors, he made one exception by bestowing one upon a merchant—an Israelite—who, although very orthodox in his creed, rendered very eminent services during a night, from Friday to Saturday, at the burning of a Catholic church at Oppeln, contrary to the tenets of his religion, and, by almost superhuman efforts, he saved the holy vessels and cut the altar pictures out of their frames. The priests presented him with two commemorative silver vessels, and the king sent for him, and, in a special audience, presented him with the dose, which has until now been preserved in his family. The king was very particular in having all his subjects, without reference to creed, treated alike. A colonel refused repayment to a Jew from whom he had borrowed a sum of money. The former reported him to the king, who grew very angry, and wrote an insulting letter to the colonel, ordering him to pay forthwith or be cashiered, closing with the words: "I want you to understand that this Hebrew pays his taxes to me just as well as you do, and you are therefore no more to me than he is. Frederic."

EARLIEST METHODS OF MEASURING TIME.—The story is that King Alfred had no better way to tell the time than by burning twelve candles, each of which lasted two hours; and when all the twelve were gone another day had passed. Long before the time of Alfred, and long before the time of Christ, the shadow of the sun told the hour of the day, by means of a sun dial. The old Chaldeans so placed a hollow hemisphere, with a bead in the center, that the shadow of the bead on the inner surface told the hour of the day. Other kinds of dials were afterward made with a tablet of wood or straight piece of metal. On the tablet were marked the different hours. When the shadow came to the mark IX, it was nine o'clock in the morning. The dial was sometimes placed near the ground, or in towers or buildings. The old clock on the eastern end of Faneuil Hall, in Boston, was formerly a sun dial; and on some of the old church towers in England you may see them to-day. Aside from the kind mentioned, the dials now in existence are intended more for ornament than use. In the days when the dials were used, each one contained a motto of some kind, like these, "Time flies like the shadow," or, "I tell no hours but those that are happy." But the dial could be used only in the daytime; and even then it was worthless when the sun was covered with clouds. In order to measure the hours of the night as well as those of the day, the Greeks and Romans used the clepsydra, which means, "The water steals away." A large jar was filled with water and a hole was made in the bottom through which the water could run. The glass in those days was not transparent; no one could see from the outside how much water had escaped, so there were made on the inside certain marks that told the hours as the water ran out; or else a stick with notches in the edge was dipped into the water, and the depth of what was left showed the hour. Sometimes the water dropped into another jar in which a block of wood was floating, the block rising as the hours went on. Once in a while some very rich man had a clepsydra that sounded a musical note at every hour.

Workshop Notes.

GOLD TINGE ON SILVER.—A bright gold tinge may be given to silver by steeping it for a suitable length of time in a weak solution of sulphuric acid and water, strongly impregnated with iron rust.

TO SEPARATE GOLD FROM SILVER.—The alloy is to be melted and poured from a height into a vessel of cold water, to which a rotary motion is imparted, or else it is to be poured through a broom. By this means the metal is reduced to a fine granular condition. The metallic substance is then treated with nitric acid, and gently heated. Nitrate of silver is produced, which can be reduced by any of the ordinary methods; while metallic gold remains as black sediment, which must be washed and melted.

MOUNTING THE DIAL.—The pin holes in the dial feet should be drilled with a very small drill, in such a direction that the pins will not come in the way of anything and will be easily gotten at; they should not be drilled below the surface of the plate, but broached until the pin touches it. If the hole should be a little below the surface, it is better to lengthen the copper foot by squeezing it with a pair of blunt nippers until it is above the plate, than to leave it in such a position that no pin can stop it.

RECOVERING GOLD FROM EXHAUSTED COLORING BATHS.—The collected old coloring baths are poured into a sufficiently large pot, an optional quantity of nitro-muriatic acid is added, and the pot is placed over the fire, during which time the fluid is stirred with a wooden stick. It is taken from the fire after a while, diluted largely with rain water, and filtered through coarse paper. The gold is recovered from the filtered solution with a solution of proto-sulphate of iron (green vitriol), which is stored in air-tight bottles, then freshened with hot water, and finally smelted with borax and a little salt-peter.

SIMPLE TEST BY THE SPECIFIC GRAVITY.—The goldsmith, after having smelted his bench scrapings, sweepings, etc., and reduced it into a button, desires to roughly estimate the percentage of the precious metals contained in it. This can be done approximately as follows: A certain quantity of it is taken and drawn out into a wire, which is to be exactly of the same length as one from fine silver; of course, both must have been drawn through the same hole, silver being nearly one-half lighter than gold, it is natural that the one of fine silver must be lighter, and the increased weight of the wire under test corresponds to the gold contained in it.

DUST PIPES.—Dust pipes are indispensable in a key watch, and when properly screwed on the plate and fitted to the case are expensive. This part of the watch is frequently treated with utter disregard, and we lately saw a very bad case of dust pipe of the set-hand square of a three-quarter plate watch. It was so constructed that if it was made to touch the case it would press upon the center pinion and stop the watch or make it go irregularly; to avoid this, the center parts are left with sufficient end shake to defeat the purpose for which it is designed. A solid top offers advantages in respect to dust, and perfects the key winding watch to an important degree.

THE BARREL ARBOR.—If the pivots of the barrel arbor are of the proper shape (which they generally now are in the best movements, and certainly ought to be), the pivots and holes will only require smoothing, and the barrel freeing on the arbor. Instead of adopting the usual course of turning away the bosses in the barrel and cover to reduce the rubbing surfaces, a deep hollow should be turned and a shoulder formed on each side of the arbor of a sufficient width, and the bosses should be left on the brass as large as possible. It has not been the practice to snail the barrel arbors of fusee watches as there was no trouble with the adjustment of the mainspring, English springs being tapered and generally filed thin at the eye, but the arbors should be snailed (and they probably will be now by the movement makers), and the hook should not project beyond the thickness of the spring.

SUBSTITUTION OF FIRE GILDING.—Emil Steiner recommends as a substitution of the fire gilding, which is very injurious on account of the mercurial vapors, to place the object to be gilded in a basic mercurial bath, unite it with the positive pole of a battery, and close the current until the article is fully covered with quicksilver. Then place it in a strong galvanic gold bath, and leave it therein until coated with a heavy gold film. Again enter into the first bath, and let the current again pass through until the article is fully white with mercury. It is then suspended in an evaporating furnace with a good draught, and the heat is increased to the degree necessary for fire gilding. The gilding obtained in this manner is as handsome and durable as fire gilding.

SHAPE OF RUBY PINS.—A cylindrical ruby pin cannot enter the notch so deep as it should, and the driving side of the notch will work very minutely toward the front part of the pin, and at the wheel's drop the off side of the notch will be some distance from the side of the pin; this vacuity between the notch and the pin is a loss of arc to the roller on each side of the discharge, and also causes some small portion of the lever's arc to be non-effectual immediately after unlocking, for directly after unlocking the lever will drop across the vacant space, which is perhaps 1° of the lever's arc on each side. This loss of arc by notch and pin often misleads persons in the arc of the pallets from drop to drop. When the arc of the balance, from drop to drop, is about 30° , and the roller, from staff to pin, is about one-third length of the lever, the arc of the pallets is supposed to be 10° —they are more than 10° , generally about 12° —the depths make a greater arc in unlocking than they are aware of.

THE PALLETS AND THEIR FUNCTIONS.—Each of the two pallets are shaped for the double purpose of impulse and locking; by turning the escape wheel forward, a tooth of the wheel passes over one of the impulse planes, and thereby turns the pallets and lever together through a small arc of perhaps nine degrees; and as the roller and balance are linked to the lever by the pin and notch, the balance also is simultaneously turned through an arc, the balance's arc always being much greater than the lever's arc, according to the ratio existing between the radii and the small roller and long lever. At the extreme end of the pallet plane the impulse action ceases, and another tooth of the escape wheel drops on to one of the opposite lockings, stopping all the machinery of the watch except the balance and roller, for at the instant of the escape wheel's drop the roller's stone pin passes out of, or away from, the open notch of the lever, and the balance and roller revolve by themselves, perfectly detached from the rest of the mechanism of the watch.

PARTING WITH CONCENTRATED SULPHURIC ACID.—It is not necessary to scrupulously observe the exact proportion of the gold to the silver. After having prepared the auriferous silver, place it in a quantity of concentrated sulphuric acid contained in a porcelain vessel, and let it come to a violent boil. When the acid has either become saturated and will dissolve no more, or when solution is complete, remove the dissolving vessel from the fire, let it cool, and, for the purpose of clarifying, pour dilute sulphuric acid into the solution. The dissolved silver is next carefully decanted from the gold sediment upon the bottom, another portion of concentrated acid is poured in, and the gold is well boiled again, as it will still contain traces of silver; this operation may be repeated as often as is deemed necessary. The solution, poured into the glass jars, is well diluted with water, and the silver is then precipitated by placing a sheet of copper in the solution. The precipitation is then freshened with hot water, which may also be done by washing upon the filter; the granulated (sulphate of silver) silver is pressed out in linen, dried and smelted. The freshened gold, after being dry, is first smelted with bisulphate of soda, in order to convert the last traces of silver into sulphate, and then smelted with borax and a little salt-peter.

Trade Gossip.

B. H. Knapp, of Smith & Knapp, sailed for Europe on the steamer *Etruria* Aug. 14.

Henry Randel, of Randel, Baremore and Billings, returned from Europe on Aug. 1.

Mr. F. H. Mulford, of Mulford & Bonnet, sailed for Europe on the *Eider* August 25.

Mr. W. G. Gough, with Carter, Sloan & Co., returned from Europe on the *Etruria* Aug. 8.

Mr. A. J. Lewis and G. R. Shreve, of San Francisco, returned from Europe on the steamer *Adriatic* Aug. 1.

Mr. Hamerschlag, of the firm of Falkman, Oppenheimer & Co., arrived from Europe in the steamer *Eller*.

Mr. A. K. Sloan, of Carter, Sloan & Co., and family returned from Europe on the steamer *Germanic* on Aug. 8.

Dealers contemplating disposing of their stock at auction are referred to the advertisement of C. W. Miller.

Mr. Racine, of the firm of Julien Gallet & Co., arrived from Europe on the 22d ult. by the steamship *Le Bretagne*.

M. J. Lissauer, of the firm of Lissauer & Sondheim, returned from his European vacation in the steamer *Fulda*, August 9.

Smith & Knapp call attention to their advertisement in which they present illustrations of a variety of watch cases which they manufacture.

Mr. George A. French, representing the diamond importing house of Wm. S. Hedges & Co., sailed from Europe per steamer *Servia* August 21.

Mr. Smith, of Wm. Smith & Co., after a three months' sojourn in Europe, arrived home in the steamer *Ethiopia* August 16, very much improved in health.

Frank L. Adams will represent H. F. Barrows & Co. in the West during the present season. Mr. Adams is an old traveler and has many friends on the road.

A useful souvenir is being presented to the trade by Barstow & Luther in the shape of a knife, the blade of which works upon the same principle as the automatic pencil.

W. C. Lippus, well known in the jewelry trade, has resigned his position as representative of the Columbus Watch Co. to accept one with Stern Bros. & Co. as traveling salesman.

Mr. P. L. Miles, of Cleveland, has proved to be quite a lion at Long Branch during his recent visit East. While at the Branch he saved the life of a young lady who was drowning.

Leroy W. Fairchild Co. have issued a unique little souvenir for the fall trade, calling attention to their stock of rich and artistic goods, which is more complete this year than ever before.

J. T. Scott & Co. have this season the largest line of goods which they have ever offered to the trade. It comprises everything in the watch case, jewelry and diamond line needed by a retail jeweler.

The trouble with the Knights of Labor at the factory of the T. A. Willson Co., at Reading, has terminated in a victory for the company, which proposes to run its own business without interference from outsiders.

Joseph Fahys & Co. are issuing a very attractive card advertisement of their new inlaid cases, which any dealer can have upon application. These show cards make quite an attraction for dealers to hang in their stores.

Mr. Adolph Goldsmith advertises in this issue his interchangeable initial ring called the "Peerless." The initial is upon stone, the stone being cut to fit any size ring in this series. With a small stock of rings and a full supply of initials a dealer is prepared to satisfy any customer seeking this class of goods.

Hugo, Berry & Co., of North Attleboro, are making a large and attractive line of spring bracelets, together with the Eureka cuff button. The latter has a sliding shoe on a short post and are made in a variety of fronts.

The Manhattan Watch Co. are now placing upon the market a very attractive line of low priced watches made in open face, stem wind, with an independent hand setting attachment, cased in nickel, silver and rolled plate.

A deposit of blood agate, resembling Scotch blood stone, has been discovered on Grand River, near Cisco, Utah. It covers a territory three miles square. The stones are large enough to saw into slabs for mantels and table tops.

Albe t Lorsch & Co. call the attention of the trade to their new ornamented watch case which is exhibited in their advertisement in this issue. These goods are very attractive and will prove advantageous for dealers to handle.

The firm of Benham & Grigor, of Toronto, has been dissolved, Mr. Grigor retiring to take charge of the business of his father at Kingston, Ontario. Business in Canada is reported to be in good condition and promises to be quite active this fall.

A Cincinnati street paving contractor recently found a very valuable diamond in a paving stone. Nothing very surprising in this. Many a rare treasure has ere this been found in street paving jobs, and frequently by people who apparently had nothing to do with the job.

The friends of Mr. William D. Carrow, formerly of the firm of Carrow, Bishop & Co., will be pained to learn of the death of his wife, which occurred in this city August 7. Many gentlemen in the trade have met Mrs. Carrow, and held her in high regard. She left a child but five weeks old.

Aikin, Lambert & Co. present an illustrated page in this issue of THE CIRCULAR, showing some of the special goods they have in stock for the fall trade. Among other things they direct attention to the automatic timekeepers recently introduced to this country, of which they have a full and desirable line.

J. F. Fradley & Co. advertise in this number of THE CIRCULAR their new opera glasses which are mounted in gold and silver, they being the first concern to manufacture these goods in that style of mounting. They have them in an infinite variety of designs and must prove a very attractive feature for the trade to handle this season.

At the suggestion of Treasurer Robbins, of the American Watch Company, a vote of the factory employees was taken a short time since for the purpose of ascertaining whether they preferred the weekly or monthly plan of receiving their wages. The ballot resulted in 1,658 votes for the weekly plan to 582 for the monthly. They are therefore being paid every week now.

Julien Gallet & Co. notify the trade that they are the sole owners for the United States of the patent under which the automatic timekeepers are manufactured. This timekeeper is a watch that has an enameled surface instead of a dial, there being perforations in it wherein figures appear at proper intervals to designate the hours and minutes, the seconds being recorded on a small dial.

We would call the attention of the dealers visiting the city this season to a large stock of complicated watches carried by J. Eugene Robert & Co., consisting of chronographs, with and without split seconds, minute repeaters in various grades, ladies' and gents' stem winding movements, fitting all sizes of American cases. Small size watches in great variety, cased in gold, silver and nickel.

Mr. R. A. Kettle left for Chicago during the past month to take charge of the Western business of Robbins & Appleton. His departure leaves Mr. P. K. Hills in charge of the John street office of the firm in this city. Both gentlemen are well known to the trade, having been with the company for many years, and are entirely capable of filling the responsible positions to which they are appointed.

The travelers will be pleased to know that the Burnet House, Cincinnati, Ohio, has been rebuilt and refurnished, and otherwise improved by the addition of two large fire proof vaults on the ground floor for jewelers' trunks, and is now the headquarters for jewelry travelers. The house is under the same management as formerly, and we trust Zimmerman may meet with all the success he is entitled to.

H. Muhr's Sons, of Philadelphia, have issued a very handsome illustrated catalogue in connection with their manufacturing jewelry department. It contains illustrations of their thimbles, filled rings, initial rings, band rings and stone rings, in many new and attractive designs. The goods bearing the "Crown" trade-mark of this firm are so well known in the trade that commendation at our hands is unnecessary.

The interchangeable initial ring manufactured by Odenheimer & Zimmern is meeting with great favor in the trade. The initial is incrustated in gold upon stone, and it is the stone that is interchangeable, so that a dealer carrying a small line of rings can supply any number of initials to fit them that may be required. The stones are made to fit any ring, so that a customer being fitted with a ring, his initial is readily supplied.

Healy Bros., who were recently burned out at Attleboro Falls, have removed to North Attleboro and engaged the ground floor of the Totten Building, where they have increased facilities for manufacturing their specialties. The anti-pickpocket swivel has been considerably improved in general appearance, the prongs now being made round instead of square. This firm desire to extend their thanks to the jobbing trade for the courtesy extended to them during their trouble in the recent fire.

"A good name is better than riches," saith the proverb. A letter was recently received at the Boston post office, addressed to "Rogers Bros., the Silverware Brothers, Boston, Mass." The missing link was supplied by the postal officials in Boston, and the letter was remailed to the old reliable house of Rogers & Brother, 690 Broadway, New York, for whom it was designed. The name of Rogers & Brother is known all over the world, and wherever known is associated with goods of the best quality.

Suit was entered in the Court of Common Pleas, in Lancaster, Pa., August 25, by J. L. Steinmetz, who represents George Greenzweig, the surviving partner of Nast & Greenzweig, wholesale jewelers of San Francisco, Cal., against the Lancaster Watch Co. The declaration sets forth that on June 22, 1883, the firm agreed to become the sole agents of the Lancaster Watch Co. for the sale of their watches in the Pacific States, Mexico, the Central American Republics and the Sandwich Islands; that they were ready at all times to carry out their part of the contract, but that the Watch Co. sold their movements to other firms. They ask for \$40,000 damages.

Of the dealers in town during the past month we noticed C. P. Barnes, Louisville, Ky.; B. H. Stief, Nashville, Tenn.; Charles Jebb, Jacksonville, Fla.; W. Rolliston, St. Augustine, Fla.; Justis & Armiger, Baltimore, Md.; H. S. Wolf & T. Shannon, Philadelphia, Pa.; J. C. Woeffle, Peoria, Ills.; J. F. Giering, Nazareth, Pa.; F. W. Strong, Hagerstown, Md.; S. A. Rhodes, Little Falls, N. Y.; Geo. Goddard, of Goddard, Hill & Co., Pittsburgh, Pa.; R. N. Galbraith, of Duhme & Co., Cincinnati, O.; O. Allen, Toronto; J. Karr and T. S. Moore, Washington, D. C.; M. Rosenthal, of Heinz & Rosenthal, Quincy, Ills.; J. N. Mulford, Memphis, Tenn.; Wm. Schweigert, Augusta, Ga.; Wm. L. Masters, Lynn, Mass.; Wm. Reed, Plattsburg, N. Y.; I. G. Dillon, Wheeling, W. Va.; S. A. Simmons, Wappinger's Falls, N. Y.; S. Tripp, Millerton, N. Y.; Aug. Loch, Allegheny, Pa.; Gustav Marcus, of Levison Bros., San Francisco, Cal.; T. E. Thompson, Galveston, Tex.; G. W. Marquardt, Des Moines, Iowa.; I. C. Woeffle, Peoria, Ills.; S. Hyman, Chicago, Ills.; Jas. Allan, Charleston, S. C.; C. H. Carr, Hartford, Ct.; C. H. Duhme, Cincinnati, O.; W. H. Hennegen, Baltimore, Md.

The Dueber Watch Case Co. have just issued a handsomely illustrated catalogue showing the different styles of cases manufactured by them. The catalogue is beautifully printed in blue, while the illustrations are in black upon fine tinted paper. It makes a very attractive little book, and gives a very satisfactory idea of the numerous styles of cases manufactured by this company and the manner in which they are ornamented.

Among those returning from a European trip of pleasure and profit during the past month was Mr. S. F. Myers, of the firm of S. F. Meyers & Co., of this city, who came back on the new French steamer *La Champagne*, which arrived August 14. He reports prospects very encouraging for the fall, and that his house will receive many new novelties in different lines from the other side during the coming month, many of which will be illustrated profusely in their annual catalogue, and represented in the lines of their several travelers.

With the close of August, the Saturday half-holidays come to an end for the season. They have been greatly enjoyed by hundreds of employees in the jewelry trade, and we are sure no one has been the loser by them. Those who have enjoyed the privileges thus granted by the employers, have been so much benefitted by their recreation in the country or at the seashore that they have returned to their labors with renewed energy, and have given better service and with better heart because of their brief vacations. The volume of business transacted has not been injured to the extent of a dollar in consequence of these weekly breathing spells, and everybody is now in better condition to enter upon the lively fall campaign that is anticipated. The half-holiday plan has worked so satisfactorily to all concerned, that it can be considered a fixed custom in the trade for the future during the summer months.

Thieves recently succeeded, by means of the fire escape on the Barclay street side of the Astor House, in gaining entrance to the rooms of some of the guests of the hotel opening upon the series of balconies constituting the escape. Four rooms were visited by them, from each of which they secured a small amount of plunder. The occupants of one of these were Mr. Charles W. Hempel, representing F. S. Gilbert, of North Attleboro, and Mr. Frank Reynolds, of the Reynolds Jewelry Co., of Providence. These gentlemen were victimized to the extent of about \$50 cash, a gold watch and notes amounting to about \$1,200, and some other small articles. A gentleman occupying a lower floor lost a few dollars, while the thieves left his vest behind, in which was over \$2,000. The proprietor of the Astor House, Mr. Allen, made good the losses of his guests, and extended to them the hospitalities of the house. This is the first time that thieves have succeeded in gaining entrance to the Astor House since it was first opened, many years ago.

A Waltham watch of unique design of case, which was stolen from Mr. Hale, then manager of the Waltham Watch Co., New York, in 1884, turned up in Chicago on Friday under rather remarkable circumstances. Mr. Hale had had the watch manufactured specially as an intended present for a friend. It was, much to his chagrin, stolen from his pocket in a New York street car by two professional thieves. A. G. Sheldon, the General Western Agent of the Chicago, Burlington and Northern Railroad, purchased the watch when in Philadelphia last June from a reputable jeweler who had obtained it from two broken young gamblers for \$100. Friday last Mr. Sheldon happened to meet an old friend, and the two fell to discussing the merits of their respective watches. To settle which was the better article a messenger was sent over with the two to the office of the Waltham Co., in State street, and there it was discovered that Mr. Sheldon's watch was the identical Waltham stolen from Mr. Hale in 1884. The watch had been somewhat altered by the addition of some engine turning on the case, but the number and general design established its identity beyond a doubt. The watch was returned and Mr. Sheldon was reimbursed.

For the information of several persons who have written to us upon the subject, we beg to state that the advance slips of our department headed "Fashions in Jewelry," are sent out each month to whoever desires them, without cost. We are glad to furnish these to the trade with a view to having extracts from them copied into the local papers. It gives us pleasure to note the fact that Giles, Bros. & Co., of Chicago, reproduce these fashion articles in a handsome little book each month, which they mail to residents of Chicago and the vicinity. The purpose of these articles is to inform the public as to the new styles and fashions in jewelry, and the wider the circulation and the greater publicity given to them the better it will be for the retail trade as well as for the manufacturers. We repeat our invitation to dealers all over the country to send for them. All that is necessary is to drop us a line and the slips will be mailed each month in advance of their publication in THE CIRCULAR.

The death of Frank S. Draper, of the firm of F. S. Draper & Co., of Attleboro, took place in that village on Sunday, August 15. Mr. Draper was the son of Josiah Draper, a native of Attleboro, and was born in that place in 1829. His father was the senior partner in the old firm of Draper, Tift & Co. Young Draper served an apprenticeship with Tift, Whiting & Co., and became the head of the firm which subsequently became Lincoln, Bacon & Co. In 1860 Mr. Draper sold out to his partners, and on the breaking out of the war enlisted as a first lieutenant of the Forty-seventh Massachusetts Volunteers. He held various important positions during the war, and made an excellent record for himself. In 1866 he returned to North Attleboro and organized the firm of Draper, Pate & Bailey, Mr. Draper acting as salesman. Through various changes this firm continued in existence up to the present time, Mr. Draper's name being prominently associated with it. At the time of his death he was president of the First National Bank of Attleboro and vice-president of the Attleboro Savings Bank. He was also prominent in the Masonic fraternity. Mr. Draper had been in poor health for several years, and had sought relief by changes of climate and in various other ways, but finally succumbed to the disease it was impossible to eradicate. He leaves two children, Joshua E. and Frank E., now of North Attleboro. The deceased was well known to the jewelry trade as one of its active, enterprising and honorable manufacturers, and was held in the highest esteem by all who came in contact with him.

Gilbert Yost, the noted safe burglar and inventor of burglars' tools, has just died in the Northern Indiana Prison, where he was serving a fourteen years' imprisonment. He was the inventor of a set of burglars' tools, weighing less than five pounds, which enabled him or any one understanding the tools to open any ordinary fire-proof safe in less than fifteen minutes, without making the slightest noise. For a number of years Yost worked with these tools without the secret of his invention becoming known to other parties outside of those who were his immediate associates and worked with him. This whole set of tools could be carried in an inside coat pocket without being noticed. Yost and his confederates with this set of tools confined themselves almost entirely to robbing safes of country jewelry stores, and so successful was their work that the wholesale jewelers found it necessary, in order to protect retailers, who in many instances were their creditors to large amounts, to form what is known as the Jewelers' Security Alliance, for the purpose of following up and punishing burglars who robbed its members. The Alliance retained the Pinkertons as their detectives. He was arrested for a jewelry robbery in Indiana, for which he was serving out his sentence when he died. Yost had a great habit of feigning insanity when arrested, and on this dodge succeeded several times in getting out of his trouble. When sent to prison in Northern Indiana for the Veil burglary, the keepers recognized him as a former inmate of the prison who had feigned insanity, and this time, although Yost pretended to be insane and refused to do any work, he was kept in close confinement from the time of his arrival until his death.

The New England Manufacturing Jewelers' Association held their first quarterly banquet at the club grounds near Providence, July 31. President A. S. Potter occupied the chair. The report of the Secretary and Treasurer showed a balance on hand of \$864.44, and it was ordered that \$600 be deposited in bank. Several new members were admitted, and a committee of three was appointed to prepare amendments to the By-Laws. Subsequent to the business meeting, a game of baseball was played by teams composed of members of the Association. Then followed the banquet, which was thoroughly enjoyed by all present, a vote of thanks being tendered the Executive Committee for the excellent arrangements that gave a pleasant afternoon to so many members of the trade.

A novel advertising feature has just been introduced by Howard & Cockshaw, No. 36 John street, in several jewelry houses in Boston, Chicago and New York. This is a live maquech bug, which is harnessed in gorgeous trappings of gold and silver, and permitted to parade in various show windows. This lively insect is intended for the decoration of ladies' bonnets, but at the same time he serves as a most admirable advertisement. This little creature, about an inch and a half long, belongs to the beetle family, and is a native of Yucatan, where it is indigenous to certain trees, upon the decayed portions of which it feeds. It is comparatively long-lived, not infrequently reaching the advanced age of two or even three years, provided he is well and hospitably treated. When received in this country his cage is a small perforated box, which is filled with decayed wood, upon which they feed heartily and wax fat. Where they are kept for decorative and show purposes they are fed upon rotten wood of almost any kind, the insect not being particular as to the special kind of wood offered him, provided it is sufficiently decayed. They are fastened by a light gold chain made fast to the body by means of little gold bands, and they are permitted to range over a lady's bonnet or in a show case within the limits of their chain to the extent of their own sweet will. There seems to be some confusion as to the spelling of the name by which this insect is known, as we find it spelled "mochette," and in another place "maquech." The purchasers may take their choice as to designation, as it makes very little difference to the bug what you call it provided you give it plenty to eat.

A new article for the manufacture of lamps, vases and decorative articles in general has been introduced, and is called aventurine ware. This is a mineralogical term especially applied to this new product which resembles translucent quartz, spangled throughout with scales of yellow or redish mica. The foundation of this new material is gypsum, which is combined with three other materials, and all being dissolved into a liquid. This liquid after the lapse of a certain period is poured into moulds specially prepared for it and is then hardened by exposure to heat. It can, of course, be moulded into any shape, and makes hollow ware without a core by special manipulation by expert workmen. After the article in hand is properly hardened, it is smoothed and baked, a sizing is put on, after which it is colored to any desired color. Then mica scales are shaken over the surface, after which the artist takes the article in hand and applies various colors in the way of lacquer and decorative work. Designs in relief are thus illusively produced, for upon examination they will find simply a flat surface. The material can be etched or engraved and enameled to suit the fancies of the artist having the matter in hand. If necessary, metallic attachments, as for lamps, etc., can be affixed. The finished object is beautiful and striking. The glitter of the mica showing through the transparent but colored lacquer gives a very brilliant and attractive appearance to any article thus treated. The strong electric lights or gas heightens the effect of this work very materially. It is applicable to any sort of decorative work, and is used extensively in the manufacture of lamps, vases, etc. The sole agency for these wares in New York is 31 Maiden Lane, held by John Wilson's Sons, where examples of this new and very beautiful ware can be seen.

King & Eisele call attention to their advertisement in this month's issue. They show new design of Knight Templar's badge. The firm report business brisk in their factory, and they are obliged to work overtime. Their patent antique edge chased ring is in large demand. They are also making special reduction sales, and have circular to that effect.

Mr. Condit, Secretary of the Board of Trade, at a recent meeting presented his quarterly report from May 1 to the close of July. He reported 184 claims received and on hand during the quarter. Of these 91 have been settled, as follows: 11 by attorney, 7 by notice, 14 returned as worthless, 50 withdrawn, 47 prior to my taking possession but not marked off of records, 8 paid direct, thus leaving 93 claims now on records, aggregating in amount \$8,623.69. Quite a number of these claims are in judgment. The department of records and reports has been kept active prosecuting inquiries and making reports to members. Regarding failures and assignments the report says: "Seven meetings of creditors have been held, all of them, I am pleased to mention, in connection with failures which occurred prior to my coming here, thus showing that the failures in your line of trade for the past three months has been comparatively few, which is a natural indication of a healthier state of business and trade generally. In this department, then, there are large opportunities for improvement, and that cannot be accomplished unless creditors, members especially, in all cases join hands and immediately take concerted action to control the matter instead of individual action, by which at the end all but secured creditors get left. This point, gentlemen, if you will allow me to suggest after my years of observation and experience, is one of the strongest parts of associations of this kind, and if properly supported and lived up to, is bound to build up this one and give it strength and power, while in the long run your yearly balance sheets will show fewer losses and larger dividends in the aggregate. The collection bureau is now in complete working order and thoroughly prepared to handle your business, and I sincerely hope will receive more patronage from you the coming quarter than it has the present one."

During the past month, while on an eastern trip, Mr. Frank M. Harris, agent for Smith & Knapp, wholesale jewelers, 182 Broadway, New York, reported at the police station at Newport that the trunk that he had shipped to that city was missing. He was exceedingly anxious to discover its whereabouts, as it contained \$10,000 worth of diamonds. Nothing could be learned concerning it here, but at last it was happily thought that it might have made its way somehow to Block Island on the steamer *Danielson*. There was no way of reaching the island then except by chartering a small steamer or by sailboat; but Mr. Harris was too anxious concerning the valuable property missing from his care to be willing to wait until morning. So attempts were made to charter the *Herman S. Caswell* and other small steamers here, but none could be obtained. Finally the veteran captain Tom Shea was visited, and he readily consented to take the party to the island in his catboat, notwithstanding the heavy wind that was blowing. Captain Hammond and Mr. Harris accordingly boarded the catboat and Captain Shea put out from the wharf at 8:20. The run to the island was a very lively one with the wind in favor of a quick passage. The island was reached at 12:05. Some difficulty was experienced in arousing Captain Conley, of the steamer *Danielson*, as he lived some distance from the landing, but at last he was obtained, and a search resulted in finding the trunk, where it had been brought over on the *Danielson* by mistake. Mr. Harris was greatly relieved to obtain possession of his valuables again, and to find that their loss was due to a mistake and not to an attempt to rob him. The party again embarked for Newport at 2:18 o'clock yesterday and reached Newport at 6:10, after a very rough and lively trip. The wind blew heavily and the sea ran high. Much credit is due to the local authorities for their promptness in the matter, and to Captain Shea for his willingness to undertake the trip in his catboat under circumstances of discomfort and danger.

The great exhibition at Minneapolis, for which such elaborate preparations have been made, was formally opened on Monday, the 23d of August. A magnificent new building, embracing over seven acres of exhibition room, has been erected on the East bank of the Mississippi, overlooking the falls of St. Anthony, and, as it is proposed that this shall be maintained as an exhibition building, great preparations were made to have it opened with great eclat. President Cleveland consented to start the machinery running at the proper moment, and as he was with his wife fishing in the Adirondacks, telegraphic communication was established so that by his touching the instrument in the mountains, the machinery at Minneapolis would be started instantaneously. There were many distinguished persons in attendance and considerable eloquence was indulged in on the occasion, but at last word was sent to the President that all was in readiness, and Mrs. Cleveland was invited to participate in the opening ceremonies. The President sent a message of greeting, after which his wife touched the key of the electrical instrument, and instantly the great mass of machinery a thousand miles away was set in motion. This exhibition has taken on something of a national character, for, having completed the new building, with true Minnesotian enterprise, the projectors determined that this should be the finest exhibition that was ever held in the Northwest. The whole country has been invited to take part in it, and the responses have been numerous from all sections. The accounts in the daily papers glow with the descriptions of the perfection of everything, and there is little doubt but Minnesota has this time secured the most complete and attractive exhibition ever given in the country, except those of an international character. There are many exhibits from the jewelry trade, regarding which we will probably have more to say in our next issue, the opening occurring too near the date of our present issue to enable us to do justice to the subject.

Attention is directed to the advertisement in this issue of THE CIRCULAR of B. & W. B. Smith, the well known interior decorators and furnishers. They present a series of illustrations of elegant show cases, specially made by them. Almost every variety that can be desired for the purpose of displaying goods to the best advantage are made by this firm. Indeed, these gentlemen have reduced the matter of interior decoration to a fine art, and by the employment of original designs and choice woods of different varieties, they are enabled to produce the most elegant effects. Many of the most prominent and attractive business houses in this and other prominent cities owe their attractiveness to the artistic workmanship of this firm. While they are prepared to furnish show cases in every variety, form and style, their most elaborate work consists of finishing the interiors of stores, so that all the wood work therein shall harmonize and be in keeping with the character of the business transacted. One has but to glance through their show room, at their place of business, to obtain a good idea of the endless variety of styles and designs they have at command, all of which are original with them, to enable them to do the artistic decoration for which they have achieved so enviable a reputation. The Messrs. Smith were the first, we believe, to make a specialty of this class of work. It was formerly thought that any cabinet maker was competent to put up shelving, make show cases, etc., but by making a specialty of this class of work, and combining artistic tastes with mechanical ability of a high order, these gentlemen have virtually created a new industry, of which they stand at the head. In their show rooms are many large photographs of different stores that owe their attractive appearance to the handiwork of the Messrs. Smith, and from these any one desiring similar work can obtain ideas as to what will be appropriate for the space he has to fit up. It costs no more to do interior fitting in an artistic manner than to have it botched by inexperienced workmen, and we cheerfully commend the Messrs. Smith to whoever has work of this kind to do.



THE
JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silversmiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

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Business Prospects.

THE OUTLOOK for business has never been better than it is at the present time. In all lines of industry trade has manifested an unusual activity during the past two months, and buyers have been purchasing with great liberality, while our wholesale merchants and the forwarding lines have had all they could do to fill orders and deliver goods. This prosperity has extended into the jewelry trade, so that everybody has been greatly encouraged. Manufacturers are pushing their productive capacity to its fullest extent, and not in several years have the factories given employment to so many men as at the present time. Reports from the retail dealers in all sections of the country are unanimous in promising a continuance of this activity during the fall months, or until the end of the holiday season. It is really marvellous to see the masses of freight that are now being sent from the city by railroad and steamship. The river fronts are crowded daily and continuously with trucks, drays and express wagons delivering goods to the transportation lines, till the blockade is almost continuous from morning until night, requiring the services of extra policemen to keep a passage way for the street cars and pedestrians. The plentiful harvests of this year have given renewed confidence to everybody, and, as a consequence, money has circulated freely in all avenues of trade. Another evidence of this is shown in the decrease of the amount of surplus held by the banks; the money heretofore hoarded by capitalists and which lay unproductive in the banks, has been withdrawn and set afloat in

commercial and industrial enterprises. To such an extent has this occurred that money, from being a drug in the market, has advanced materially for ordinary transactions. The retail dealers were in excellent condition to absorb a very large volume of goods at this time, having permitted their stocks to run low and the growing demand requiring them to stock up more fully. Collections, too, are easier, and, in fact, the two months just passed have shown a greater degree of activity in the jewelry trade than has been known for several years. There is little danger of overdoing this just at present because of the low stocks in the hands of the retail dealers, but a let up must be expected by the jewelry trade. The next worst thing to a dull season is an overstocked market, and it is greatly to be hoped that manufacturers and jobbers will bear this fact in mind and not try to force goods upon unwilling buyers to an extent calculated to overload them or that shall be in excess of the actual demand. When demand and supply meet fairly and squarely the highest degree of prosperity is assured. The trade of the past two months will unquestionably bring up the volume of the year largely in excess of the aggregate of last year, or, indeed, several of its predecessors. Manufacturers generally are prepared to make the most of this, and we hope that while they are disposing of their goods they will not overlook that important little item of profits without which a large volume of trade is scarcely desirable. Now is the time, when their goods are in demand, for them to secure such compensation for their labor and investment of capital as should be theirs at all times.

The Standard for Wrought Gold.

THERE is a general complaint in the jewelry trade that has existed for a number of years as to lowering the standard quality on wrought gold. Every manufacturer of fine goods complains that no sooner does he put a new pattern upon the market than it is immediately reproduced in cheap metal, whereby the sale of his fine goods is greatly injured if not entirely destroyed. THE CIRCULAR has for many years advocated the adoption of a national standard for wrought gold. We have been ridiculed somewhat for this upon the ground that it was not within the province of Congress to legislate upon the subject, it being claimed that while the Constitution gave Congress the right to regulate commerce, it did not thereby give it the right to interfere in regard to those articles that go to make up commerce. This would seem to favor the idea that the lesser is to be of more importance than the greater; the matter of transportation of articles of commerce is certainly of small moment when compared to the integrity of the goods that go to make up commerce. Congress has already legislated in regard to the transportation between the several states, fixing certain restrictions upon the common carriers (railroad and steamboat lines), and at its last session it went so far as to pass

a law relative to misrepresentation regarding one article of commerce, namely, oleomargarine. This law prohibits the sale of oleomargarine under the name of butter. Now, if Congress has the right to proscribe oleomargarine because of its fraudulent character—or rather because it is sold as a substitute for another or better article—it certainly has the right to legislate to prohibit the sale of any other article upon a basis of misrepresentation and fraud. If an article of the character of oleomargarine is worthy the attention of the national legislature, certainly the character of the products of the gold and silversmiths' arts are worthy the attention of Congress. Oleomargarine is simply a cheap substitute for butter whereby a fraud was perpetrated upon the purchasers. In the jewelry trade there are many articles sold as gold of a high standard by persons not worthy to be called legitimate dealers, that are not entitled upon their merits to be classified as gold goods at all.

Misrepresentation as regards the character of the goods or the adulteration of articles of food, has been legislated upon by many states, but never before, we believe, has the federal government interfered in the premises. In New Hampshire laws have been enacted fixing the weight of soft biscuit; the measure by which milk shall be sold and the contents of each can; they require that all pressed hay offered for sale or shipped for export, shall be stamped with the name of the packer, his town and state; there is a law to determine the constituent parts of all commercial necessities and they prescribe how they should be labelled; there are laws regulating the standard and sale of illuminating oils, brands and commercial designation of flour, beef and pork, and the manner in which the articles shall be packed and sold, and in the same manner the packing and sale of butter, cheese, fish, lumber, potash, drugs and medicines, are minutely determined by statutory regulations. In the preparation and sale of all these articles there is an opportunity for fraud and the state has wisely undertaken to prevent it. Only in the case of butter has the national legislature undertaken to interfere for its protection. Now, if it is necessary that all these articles should be protected by law, it is certainly as much a public necessity that articles supposed to be manufactured of gold should be surrounded with statutory provisions to prevent the substitution of base metal for the more precious article. In no other country is there such opportunity for fraud or is fraud perpetrated to a greater extent compared to the amounts involved, as there is in articles purporting to be made of precious metals. It is not alone in jewelry that base metal is substituted for gold, but in many articles handled by jewelers the same misrepresentations as to quality are made. All this could be prevented by the enactment by Congress of a law fixing the standard of gold. Such laws exist in foreign countries and are found to be a great protection to the jewelry trade. In France, for instance, pure gold is recognized to be 24 carats fine, and adulterations are permitted as low as 18 carats, but anything of less than 18 carats is pronounced to be base metal and must be sold as such. In England no gold goods under 18 carats fine can receive the Hall stamp as provided by law. In other countries standards almost identical with those of France have been adopted, and as a consequence the jewelry trade is protected from the introduction of imitation or bogus goods, to be palmed off as genuine gold. A person buying in England an article of jewelry or plate bearing the Hall stamp, knows that he is getting value received for his money, that there is no imposition in the goods, that the metal of which they are composed has an intrinsic value. In France the jewelry one finds there he knows to be of the standard prescribed by law. No 8 or 10 carat goods can be palmed off as gold, as is done in this country, but everything below 18 carats fine must be sold as imitation goods. Severe penalties are provided for any infraction of the laws.

There is, of course, great difficulty in the way of stamping gold goods, but that could be overcome by providing that every invoice should specify the quality, and that every bill of sale should constitute a warranty, penalties being provided for any misrepresentation,

either in the goods or in the bill. But all this difficulty is obviated in the French law, which requires that the imitations shall be designated definitely as to their character, thus leaving the gold goods to stand upon their merits without any particular designation. The adoption of this law in this country would impose hardships upon many manufacturers whose products would not begin to approach the standard (18 carats). It is suggested, too, that there is a demand for gold goods of a lesser degree of fineness than 18 carats and that it would be unfair to denounce as base metal all that fell below this standard. That might be obviated also; placing the pure gold at 24 carats fine, the law might provide that any gold between 24 and 12 carats might be classified as gold goods, each quality being properly designated, and that all below 12 carats should pass as base metal. There would be no particular hardship in this, for an article that is not within 50 per cent. of the maximum of the standard certainly has no right to be classified as gold.

A leading manufacturer, conversing upon this subject recently, said that the manufacturing jewelers were practically killing the goose that has laid for them the golden egg for so many years. They have continued to degrade the quality of their goods year by year, until to-day there are many articles made and classed as gold in which no particle of the precious metal enters. Manufacturers have experimented with alloys until they have brought them down to so fine a point that the gold is entirely omitted. This cheapening of gold has been going on so long and is carried to such an extent that the public has become distrustful of the jewelry trade in general, and no purchaser feels entirely sure that the jewelry he is buying is genuine. Wholesale and retail dealers are in the same boat, and are as liable to be deceived by a manufacturer as is the public. Having more knowledge of the characteristics of jewelry and of wrought gold, they are liable by tests to detect the false from the true, but so close imitations are made now-a-days that it is impossible for even the dealers to tell the good from the bad simply by their appearance. The manufacturer referred to deplored this degradation of quality and said that in his own experience he could testify that, although it cost less to manufacture goods of degraded quality than it did fine goods, yet the profits of the dealers were larger when the goods were all of the real article, and that it took no more time and trouble to sell a good article of jewelry than it does the cheap and tawdry stuff that has of late years usurped and taken its place to so great an extent. The trade has not only lost dignity and standing because of the frauds perpetrated in its name but it has also lost profits. There has been a strife between manufacturers of cheap jewelry to see which could make the cheapest and still preserve the same appearance of gold in their products. These goods have flooded the markets and taken the place of a better class of jewelry. There is no way to remedy this evil except by national legislation that shall fix a standard for wrought gold, and thus drive the imitation and base metal out of the field, for it is well known that if these cheap goods were presented to the public for what they are worth, they would find no sale whatever, or at best a very limited sale. It should not rest with the manufacturers of genuine gold goods to declare their quality: on the contrary, let the imitation goods be labelled and ticketed for what they are worth, while the public shall be taught to take it for granted that whatever is offered as gold is fully up to the regulation standard. It might be made as much of a misdemeanor to counterfeit the precious metals in any form as it is to counterfeit those metals when made into currency by the government itself. Gold and silver are recognized the world over as precious metals; they possess an intrinsic value that renders them available in every country in the globe; and they are altogether too precious to be tampered with with impunity. A national standard for wrought gold would be more of a protection to the well-known honest jewelry trade than it would be even to the public, for the jewelry trade is the greatest sufferer from the degradation of quality that has been going on for several years past. It is the trade that needs protection

more than the public, and it is the trade that should demand of Congress the passage of laws which, like that which proscribes oleomargarine, shall proscribe the adulteration of the precious metals. By so doing it would recover much of the standing it has lost because of the unscrupulous men who have used it as a cloak under which to prosecute their nefarious operations, for they would be driven to seek other occupations.

New Markets for Trade Wanted.



WE HAVE at times deprecated the apathy shown by our government in the matter of developing or facilitating trade between this country and other nations. There are certain fields that should be cultivated more or less by our merchants, but they cannot be reached under the present conditions and in the face of obstructions that can only be removed by the interference or co-operation of the government itself. The British, French and German governments have done much to facilitate the transactions of their merchants with foreign countries; not so much, perhaps, by their interest manifested in any given branch of industry as by a general desire for the welfare of the productive classes. This is all that the merchants of this country would ask or expect of our own government; if they can be afforded facilities for transportation, and their goods laid down in foreign countries as economically and as readily as the goods of foreign manufacturers are placed in those countries, they would have nothing further to ask. But this is not so, for while these foreign governments are constantly developing their means of communication and transportation with foreign nations, ours stands by and throws obstacles in the way by which private enterprise is intimidated and our manufacturers discouraged. Recent London journals contain copious extracts of a very interesting correspondence regarding the question of assistance to British trade abroad which has just been issued by the English Foreign Office. This correspondence had its origin in various suggestions that were made by the London Chamber of Commerce, and other parties and individuals to the Foreign Office. The question raised was whether some assistance could not be given to British traders in foreign countries by British consuls who are serving the government abroad. The responses that are now published as a part of this correspondence contain the suggestions made by the Chamber of Commerce on the one side and on the other the responses made by the commercial authorities, consuls and ambassadors of the government, with the conclusion at which the Foreign Office had arrived. This demand upon the Foreign Office for increased facilities for communication with foreign markets was the result more or less, not so much of the representatives of Great Britain abroad, as with the competitors of British merchants, especially in the far east. The Germans and Americans, it was claimed, have been securing of late years a larger and larger share of the Chinese trade, and in seeking for the reason why this should be so the London Chamber of Commerce came to the conclusion that it was "because its merchants were assisted in their undertaking by the moral and frequently by the active personal effort of their ministers." The Foreign Office expressed the same idea when it speaks of "the successful efforts of the German and other foreign governments in pushing the trade of their respective countries in foreign markets in competition with English manufacturers." Englishmen must know very little of the policy of the American government when it attributes to it the trait of "pushing" the trade of our manufacturers and merchants. The only thing that the American government has done in this direction is the publication of certain statistics prepared by our consuls in relation to the demands of the people among whom they are supposed to dwell. The State Department has published from time to time these reports of consuls which are of value regarded in the light of

suggestions, showing as they do what American products might be made available in these countries, provided they could be placed there upon terms that would enable them to compete with the manufacturers of Great Britain, France and Germany. In all these reports of our consuls the idea is conveyed that the merchants of other countries have a decided advantage over us because of the superior transportation facilities they enjoy, whereby the cost of freight is less to them than to us, and the means of communication more rapid. Great Britain, especially, furnishes to its merchants extraordinary facilities in the way of putting down their goods in foreign markets. Steamship lines are subsidized and thus enabled to pass to and fro with regularity, when private enterprise would utterly fail to accomplish this. The sums paid by the British government every year to its transportation lines, either in the way of subsidies or disguised under the name of mail services, are simply fabulous, whereas our government is persistently refusing to subsidize any kind of steamship lines, and has placed the price of transporting mails at such a ridiculously low figure that some lines have refused to carry them at all.

In replying to the questions propounded by the Chamber of Commerce the British Foreign Office intimates that the development of trade in foreign countries is not a matter for governmental interference, but should rest entirely upon private enterprise. It says, "that while its diplomatic agents abroad are expected to exert themselves to their utmost within their legitimate domains to protect the commercial and business interests of Her Majesty's subjects in foreign countries, the government deems it obviously impossible for the government to take the place and thus undertake a work that should properly belong and can better be discharged by private enterprise; that Her Majesty's government can only exert their power and hear the complaints which occur and which are brought before them by the British agents in foreign countries, and thus legitimately assist British traders." But the merchants of Great Britain are reminded that official action has its legitimate sphere, and that there are kinds of assistance that cannot be given by public officers without risk, not only to their own character and position, but even to the dignity of the government they serve. It was probably no part of the scheme or idea of the Chamber of Commerce or of the merchants of Great Britain, that their consular agents abroad should become agents for the manufacturers and merchants of Great Britain. If they did the Foreign Office very properly administered a severe snubbing. At the same time, however, it would seem to be a very proper function of the government to promote the interests of its own citizens to the best of its ability in their dealings with foreign nations. There is a certain amount of encouragement that the representatives of a nation in service in foreign countries can give to the business men of their own country, without involving in any way their official dignity or integrity, and this they should be encouraged to give under all circumstances. Indeed, we believe it to be a part of the instructions of our representatives abroad to do this on all proper occasions; but the government can give more than this if it chooses, by establishing not only friendly but intimate relations with foreign governments, extending our acquaintance and communication with them, and taking measures to make them acquainted with the enterprise and capacity of our people, with the development of our country, of its resources, and its capacity for supplying the wants of other nations. It is by precisely these means that private enterprise has brought to our shores the millions of immigrants that have come to us within the past few years. The government of the United States said to all peoples, "come to us," but it never took any measures to give force to this invitation; it held out no inducements for people to come. It remained for private enterprise to do this, and when our railroad systems reached out into the great west, thereby acquiring immense tracts of land, they saw that to make them available they must people them, and it was they who sent abroad for these immigrants who wanted homes, and brought them among us, giving them what they wanted. It was individual enter-

prise that held for these inducements, not the government, but it is not feasible for private enterprise to invade foreign countries for the purpose of introducing its goods and products and competing with other nations, while those other nations have certain advantages favorable to them which our government fails to provide. In short, our merchants and manufacturers require of our government simply that they be placed on an equality with other competitors in all foreign countries where they desire to do business. They ask no advantages from anyone, for they are fully able to "paddle their own canoe," but they are not apt to make much progress when a discrimination, permitted by our government, is against them in favor of the merchants and producers of Great Britain, France and Germany, as it now is in most of the foreign countries.

Results of the Coinage of Silver.



THE CIRCULAR has been one of numerous journals in the country that has persistently advocated the repeal of the law of Congress that requires the treasury department to purchase and coin into debased dollars silver at the rate of \$2,000,000 per month. This law has been in force now for several years. The result being that the vaults of the treasury department are filled to overflowing with silver dollars, whose intrinsic value is only about 73 per cent. of their face value. The business of the country refuses to absorb this currency, notwithstanding the efforts that have been put forth by the government to force it into circulation. It is a clumsy, heavy, awkward coin to handle, is a fraud on its face and the commerce of the country, that is now prosecuted at a low margin of profit, cannot afford to carry or use a coin whose intrinsic value is so far below its face value. A proposition was considered at the last session of congress for repealing this law, but unfortunately the silver interest, representing the mine owners and silver producers, was too strong to permit the repeal of the law, and after considerable debate the measure was defeated. As a consequence the government must go on buying silver from these producers, and making it up into coin that nobody wants and that is a burden to the treasury department.

A correspondent who seems to have given some study to this question, asks us what will be the probable effect of this continued coinage of the silver dollar? While we do not pretend to foresee all the results that may follow the continued manufacture of a depreciated currency, we can at least predict what is likely to follow from what has occurred in the past. It is not too much to assume, therefore, that the consequence of this continued coinage of silver on the present basis, if continued sufficiently long to produce its full effect, will be attended with the following consequences: 1.—The constant increase of these dollars in the Treasury of the United States, because the people do not want them for practical use, will at length compel the government to pay them out, at their nominal value, in liquidating its liabilities, including the interest and principal of the public debt; and this will force such dollars upon the people, whether they want them or not. 2.—When the government is compelled to take this course silver dollars, not now worth more than seventy-three cents on the dollar, will, by a well-known law, become practically the standard in which all values, in both commodities and debts, will be computed; and thus the country will, to all intents and purposes, become mono-metallic on the silver basis, with that basis uncertain and continually fluctuating in value. 3.—Gold will be virtually demonetized, and be bought and sold as merchandise, and largely exported to other countries; and thus gold will, in this country, for the most part be withdrawn from monetary use, as was the fact during the late war and for years afterward. 4.—All monetary contracts payable in dollars, whether

public or private, will be scaled down to the depreciated and depreciating silver standard; and this will be a wrong to the rights of creditors and practical repudiation on the part of the government, impairing its credit at home and abroad. 5.—The foreign trade of the country, especially with those nations in which gold is the standard of value, will be seriously embarrassed and harmed; and this will injuriously affect our domestic trade. 6.—All branches of trade and commerce, and all industries requiring the investment of capital, will be thrown into such a state of uncertainty and doubt as to intimidate business operations and prevent the undertaking of new enterprises. 7.—The prices of commodities, as computed in silver, will be inflated and fluctuating, without a corresponding rise in the rate of wages; and this will be a severe and oppressive hardship upon all the wage-earners of the country. 8.—The other nations of the earth, as they have hitherto done, will simply look on and let the people of the United States try to their hearts' content, the experiment of making water run up hill by the power of statute law.

Such are some of the things which, as we apprehend, will follow the continued coinage of the silver dollars. We believe the coinage to be a fraud on the part of the government, because in violation of the very first principles of honest coinage, and at the same time fraught with serious evils to the country, which ere this would have been upon us but for the conservative and judicious course of those who have managed the Treasury Department of the United States, but which no amount of wisdom on their part can always prevent, provided the coinage under the existing law be indefinitely continued. A sham dollar is simply a cheat and a swindle, wrong in principle and bad in policy, and for this reason we are in favor of the repeal of the law that compels the government to continue making them at the rate of \$2,000,000 a month.

The Bankers on Silver Coinage.



THE BANKERS of the country at the convention of the American Bankers' Association, held last month, expressed, as follows, their opinion in regard to the continued coinage of sham silver dollars:

"Whereas the American Bankers' Association embraces in its membership men of every political party, as well as those who acknowledge no party obligations, it has in all its conventions carefully avoided all mere party and political questions, representing, as it does, the business public as well as the customers and stockholders of banks, it again emphatically gives warning of impending danger to the whole country in the continued coinage of silver dollars under the act of 1878. While we fully recognize the fact that both silver and gold are required as the money of the land, we believe that neither should be coined in such ratio that the other will be driven out of general use. We repudiate the idea so often maintained, that banks and bankers opposed the continued coinage of silver dollars on account of self-interest; but, on the contrary, we here assert that they have no special interest in any one kind of coin more than another, so long as each discharges its legitimate purpose as money. We believe all persons having limited means, and particularly earners of wages, will most largely suffer when the threatened evils shall come. We, therefore, earnestly appeal to all boards of trade, chambers of commerce, and civil and political associations of every kind, to make persistent efforts to secure a repeal of the law or the suspension of the coinage of such silver dollars."

This declaration, which was unanimously adopted by the convention, is in exact line with previous declarations of the Bankers' Association. The association has uniformly put itself on record as opposed to the sham silver dollar.

The Jewelers' Security Alliance.

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For further information, Application Blanks for Membership, By-Laws, etc., Address
 P. O. Box 3277. 170 Broadway, New York.

A meeting of the Executive Committee was held at the Alliance office on the 10th inst., attended by President Dodd, Vice-Presidents Sloan and Hayes, and Messrs. Bowden, Alford, White and Secretary Champenois.

The following applicants were admitted to membership in the Alliance, viz.:

Harry Mercer, Birmingham, Ala.; M. D. Rothschild, Providence, R. I.; C. S. Stiff, Little Rock, Ark.; C. T. Voelker, New York City, N. Y.

The Jewelers' League.

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At the regular meeting of the Executive Committee held Friday, Sept. 3, 1886, presided over by President Henry Hayes, there were present Messrs C. G. Lewis, E. S. Smith, J. R. Greason, W. Bardel and Wm. L. Sexton.

Five (5) changes of beneficiaries were granted.

The announcement of the deaths of Paul A. Mix and Ransom H. Platt was made, and an assessment was ordered in accordance therewith.

Two (2) applications were rejected, and the following were admitted:

Rudolph Barth, Hollister, Cal.; Earnest G. Haig, Baltimore, Md.; Wm. P. Sackett, Phila., Pa.; Adolph Bechtold, Brooklyn, N. Y.

Next meeting will be held Friday, Oct. 1, 1886.

On Repeating Clocks and Watches.

"To those who do not sleep well," says a correspondent in one of our European exchanges, "nothing can be more convenient and useful than a repeater, whether it is in a watch or in a small fixed clock." Berthoud, in his "Historie," has given the following ac-

count of it, which is chiefly taken from Mr. Derham's "Artificial Clockmaker." "The art of measuring time," says Berthoud, "was again enriched with two fine and useful inventions before the end of the seventeenth century. One was the equation clock; the other, which is the most precious, and of the most general utility, is that kind of striking which has been called repeating. It is of the most ingenious mechanism, and, when added to a clock, serves to make known at pleasure, at every instant of the night or day, without seeing the dial, the hour and parts of the hour, which are pointed out by the hands of the clock. Both these inventions are due to English artists."

"The clocks in question here," says Derham, "are those which, by means of a cord, when pulled, strike the hours, the quarters, and even some the minutes, at all times of the day and of the night. This striking, or repeating, was invented by a Mr. Barlow toward the end of the reign of King Charles II., in 1676."

It is not mentioned by Derham whether Barlow was a watchmaker or not. We have heard it said by old watchmakers that he was a clergyman. This seems in some measure confirmed by his having applied to Tompion to make his repeating watch when he was about to obtain a patent for his invention.

"This ingenious invention," continues Berthoud, "which had not before been thought of, made at the outset a great noise, and largely engaged the attention of the London watchmakers. On the idea alone, which each had formed of it, they all set to work to try the same thing, but by very different ways, whence has arisen that great variety in the work of repeating movements which was seen at this time in London. This discovery continued to be practiced in mantle clocks until the reign of James II., when it was also applied to pocket watches. But disputes arose concerning the author of the invention, and we simply relate facts to the reader, leaving him to judge of it as he thinks proper."

Toward the end of the reign of James II., Mr. Barlow applied his invention to pocket watches, and employed the celebrated Tompion to make a watch of this kind according to his ideas; and at that time, conjointly with the Lord Alleborn, Chief Justice, and some others, he endeavored to obtain a patent.

Mr. Quare, an eminent watchmaker in London, had entertained the same notion some years before, but not having brought it to perfection, he thought no more of it until the noise excited by Mr. Barlow's patent awakened in him his former ideas, and he set to work and finished his mechanism. The fame of it spread abroad among the watchmakers, who solicited him to oppose Mr. Barlow's privilege to obtain a patent. They addressed themselves to the court, and a watch of the invention of each was brought before the king and his council. The king, after having made trial of them, gave the preference to that of Mr. Quare. The difference between these two inventions is this: the repetition in Mr. Barlow's watch was effected by pushing in two small pieces, one at each side of the watch case, one of which repeated the hour and the other the quarters. Quare's watch repeated by means of one pin only, fixed in the pendant of the case, which, being pushed in, made the repetition of the hours and quarters, the same as is done at present by pushing in once only the pendant which carries this pin.

This invention of repeating the hours in small fixed clocks and in watches, was soon known and imitated in France, and these mechanisms were very common in 1728, when the celebrated Julien Le Roy devoted great attention toward improving them. It was at this period that he made the repeating clock of which a description is given at the end of "The Artificial Rule of Time." This was made for the bedchamber of Louis XV. of France.

The first repeaters, even those of Quare, as well as others, gave the number of the hour according to the length pushed in of the pendant, which was very inconvenient, by striking improper hours when the pendant was not pushed home to the snail. This frequently caused mistakes in regard to the true hour which ought to have

been given. Mr. James Cowan, of Edinburgh, who went to Paris in 1751, for improvement in his profession, and who executed some pieces under Julien Le Roy, said that Le Roy introduced the mechanism into the repeater which prevented the watch from striking anything but the true hour. This, we think, was done to the repeating clock for Lou's XV.'s bedchamber. In this construction it struck none unless the cord or pendant made the rack go fully home to the snail, when it struck the true hour, which was a very considerable improvement. The piece employed for this purpose is called the all-or-nothing (*tout-ou-rien*) piece. Considering the great talent which Julien Le Roy possessed, we have no reason to doubt of this improvement being his.

"Although the repetition," says Berthoud, "such as is now in practice, is a particular kind of striking; its mechanism differs totally from that of the striking clock; first, because every time that it is made to repeat the main repeating spring is wound up only once in eight days, fifteen days, or a month; second, in the repetition we must substitute for the count-wheel, which determines the number of blows which the hammer has to strike, a contrivance wholly different. The first author of this ingenious mechanism substituted for the count-wheel a piece to which, in regard to its form, he gave the name of the *snail*. The snail is a plain piece divided into twelve parts, which is formed of steps, and they come gradually in from the circumference to the center. It makes one revolution in twelve hours. Each of the steps is formed by a portion of a circle. Every time that the clock is made to repeat the hour, the pulley which carries the cord is connected with and turns a pinion, which leads a rack, whose arms fall on one or the other of the steps of the snail, *on the cord being pulled*, and regulates the number of blows the hammer ought to give; as the snail advances only one step in an hour, it follows that if it is wanted to be made to repeat at every instant in the hour, we shall have always the same number of blows of the hammer; whereas, in setting off the wheel work of an ordinary striking movement more than once in the hour, we should have a different hour. A count-wheel would then not be fit for a repetition. The mechanism of the repetition has a second snail, which bears four steps also in portions of a circle, to regulate the blows which the quarter-hammer must give. The count and hoop wheels, and locking plate of the old striking clocks for regulating the number of blows of the hammer, and locking the wheel work, was excellently contrived. It had only one inconvenience, for when set off by accident, it would prematurely strike the hour to come. This made it requisite to strike eleven hours before it could be brought again to the hour wanted. Had it not been for the invention of the repeater, these would have continued, and would have been still made in the modern clocks, the same as in the ancient ones. But the snail of the repeater showed that it could be adapted for regulating the number of blows for the hammer of a common striking clock, and has prevented the inconvenience of striking over a number of hours before the clock could be set to the right hour again.

"We owe to Julien Le Roy," continues Berthoud, "the suppressing of the bell in repeating watches—a change which has made these machines more simple, by rendering the movement larger, more solid, and less exposed to dust. These watches, which he called *raised brass edges*, are of a more handsome form. From the time of this celebrated artist, all the French repeaters have been made according to this model, but in England, where repeating watches were invented, they made them for the most part with a bell; and in Spain, this construction is still more preferred. In repeating watches without a bell, the hammer strikes on brass pieces, either soldered or screwed to the case. Repeating watches with a bell have also, *as well as those without one*, the property of being dumb, that is to say, repeating at pleasure, without the hammers being allowed to strike on the bell or brass pieces."

This effect is produced after the pendant is pushed in, by putting the point of the forefinger on a small spring button that comes

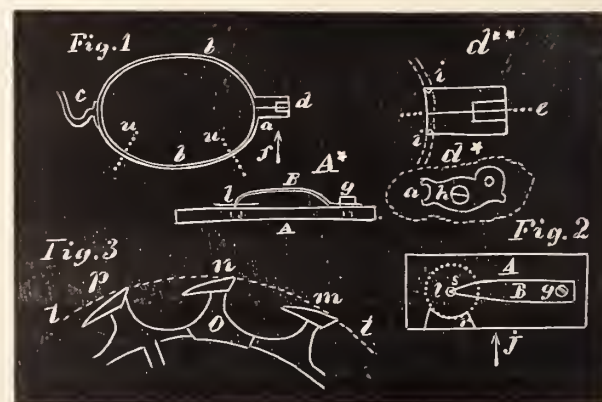
through the case. Being a little pressed in it opposes a piece against the hammers, which prevents them from striking either a bell or the brass piece inside of the case; by which means the blows for hours and quarters are *felt*, though they cannot now be easily heard. These kind of repeaters are found very convenient for those who are deaf, as during the dark of night they can feel the hour at a time when they can not see it. These *sourdines* or dumb parts have been left off of late years, yet they are not without their advantages, as has been shown.

Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



THE TENSION should be kept up on our wire we were grooving as described in September article; this can be done by gradually drawing the end wires through under the set screws, and by continued swaging we can get the wire about as we desire it, when a little filing and rubbing with fine emery paper will soon make it smooth and ready to be bent to form the eye of a nose glass or spectacles. If we have the wire for making a new eye, it is often better to do so than to try and patch up an old one, for in many instances, especially specs which have been mended several times, they will be so infected with silver solder as to be next to impossible to repair with gold solder. In this case we can use the old joint *d*, fig. 1, and nose piece *c*, simply forming a new bow *b b*. Attaching the bow *b* to the nose piece *c* is only an ordinary job of hard gold soldering, but the joint *d* is not so easy; but if we go about it right we can hard solder the joint *d* to *b* while the parts are united. At diagram *d*** is shown a joint separate and seen precisely as it is in fig. 1, only enlarged. Diagram *d** is a side view seen in the direction of the arrow *f*. In fitting the joint we can usually recess at *a* to receive the bow and hold it securely for soldering; if not, we can notch and join as shown in August number, only in that case I spoke of soldering on only one-half of the joint, while in this case we propose to solder on the joint with the two halves joined and yet not solder these two halves together. Some workmen paint over the



surface between the two halves with rouge and then join with the joint screw *h*. But the best preventive I have found is a bit of very thin mica such as is put into stove doors to let the light shine through. Mica can be split into very thin films and if put between the two halves, as shown at the dotted line *e*, and the screw *h* put through it, and the two halves screwed together, the process of soldering can be conducted as if only one piece. And when the hard soldering is done the film of mica can be removed and the two halves of the joint will be found all right. I hope the reader will permit me to digress a moment from the spectacle text and describe an application of mica in soldering with soft solder. These articles are intended for the trade, and all matters pertaining to the trade must be admissible. We (watchmakers I mean) are called upon to repair cheap Swiss cylinders, and in these repairs we are obliged to use rigid economy.

We can not say, here, your watch needs two new hole jewels, a new cylinder and scape wheel, and will cost you exactly seven dollars and a half, for, in the first place, the watch did not cost to exceed four or five dollars. No; in such cases we must put in parts as cheap as possible and round off the corners of a bill as light as possible, and keep our customer and get as much of his money as we can honestly. A common break in cylinder watches is a tooth from the scape wheel, and the use of mica makes it easy to put on a tooth with soft solder. Now, I know that many watchmakers scout the idea of soft solder, putting up there hands in a sort of holy horror at the mere idea. Now, my dear reader, the writer has had many years of experience, as announced at the head of this article, and has had to do with all kinds of watches from the worst to the best, and the result of all this is, he is convinced that cheap, poor watches have to be repaired as well as good ones. Mr. Smith has an 80 guinea Frodsham, but his son Johnny has a four dollar nickel stem winding cylinder; you, reader, must repair both, and you can charge a good round bill for papa's watch, but Johnny's is a cheap one and the repairs must be proportionate. We can not afford to let a watch go out because it is a poor, cheap one; we must repair it and accomplish the job as cheap as possible. To resume the soft solder question. *Use soft solder on cheap watches where it perfectly accomplishes the purpose for which it is intended*, and enables you to do a job well, quickly and cheaply, but don't smear it over your job. About as good a rule to be observed in the use of soft solder in watch repairing, is to never use it when there is any other good and expeditious way to accomplish the same result. In the present case we are going to put on a tooth to a cylinder scape wheel. We all have in our scrap boxes old broken cylinder scape wheels from which we can break a tooth to be applied. The special tools we need for this job are very simple. A piece of heavy sheet brass, about $\frac{1}{8}$ of an inch thick by half an inch wide and an inch and a half long is the first essential, as shown at *A*, fig. 2. At *l* we drill a hole about $\frac{1}{16}$ of an inch in diameter through *A*. It is in this hole the pinion of the scape wheel rests, and there is no danger of overheating the pinion even if the hole *l* extends quite through the brass. We next take a piece of about a No. 12 mainspring and shape it as shown at *B*, and secure it to *A* by the screw *g*. The piece of mainspring *B* is bent as shown in diagram *A**, which is a side view of fig. 2 seen in the direction of the arrow *j*. To use our tool we put the scape wheel so it is in the position indicated at the dotted circle in fig. 2. At fig. 3 is shown a portion of a scape wheel and at *n* the added tooth; the position indicated at *o* is about where the point of the spring *B* rests to hold the loose tooth *n* in position. The idea is we lay a small piece of very thin mica on *A* so it will come under the scape wheel where we are going to solder on the tooth, then lay the tooth *n* on the scape wheel where the tooth is broken out; we now swing the spring *B* around so the point *s* will rest on the tooth at *o*, fig. 3. A very little judgment will enable one to judge when the tooth is in proper position to match the others, (*m p*). A little soldering fluid applied to the parts to be joined, with a very small bit of soft solder, when the piece *A* can be held over the lamp until the solder flows. The bit of mica effectually prevents the solder from uniting the scape wheel to the brass plate *A*. After the soldering is done the scape wheel can be boiled off in chalk and alcohol to prevent rusting. In trueing up the added tooth previous to soldering a bit of brass plate (shown at *r*) of the same curvature as the wheel teeth, as illustrated at the dotted lines *l l*, fig. 3 can be used. But good judgment is quite sufficient, after a little experience, to guide the setting of the added tooth. A few additional words about soft solder for watch work. There are very few places where it is admissible and the present is one; another is putting teeth in going barrels; these are best soft soldered in after close fitting of the brass pin for a tooth; here the soft solder merely adds a fraction more security. Again, in Swiss watches where the jewel setting are completely destroyed; here we can to advantage set a jewel in a carefully made bush and soft solder the bush in place. And if the job is neatly done the soft solder is invisible. But never be tempted into

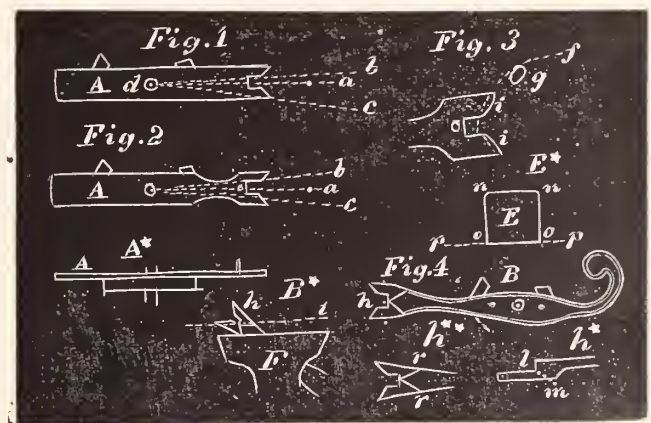
using soft solder in spectacle work. Sometimes a spec glass which is loose can be held securely in place by putting a slip of sheet lead into the groove of the bow, say, from *u* to *u*, fig. 1. After the joint is screwed down the excess of lead which protrudes on each side can be cut away with a sharp knife. But much discrepancy between the size of lens and frames should never be patched up. The best way is if the lens is too small, is to put in a new lens except in case of special lenses; then cut and reduce the frame in size.

Problems in the Detached Lever Escapement.

BY DETENT.



USUALLY in the class of watches we have been considering, the pallets and fork are attached together with one or two steady pins; hence it is difficult to set the pallet at a different angle. As, for instance, in fig. 1 we set our pallets so the lock is correct and alike on each pallet. In fig. 1 *a* represents the center of the balance staff and *d* the center of the pallet staff, and as the fork stands its action is to one side of the line of centers, consequently the guard pin would ride the roller on one side and on the other side would be too far away, as will be indicated at the dotted lines *b c* which represent the angle of the fork action. If, now, we file away the fork as shown at *e*, fig. 2, we can bend the part *e* so the action is as shown (alike on each side). We set our banking pins so the lock is all right and put in our guard pin so it is just free on each side. This can be readily determined by temporarily removing the jewel pin and letting the guard pin pass back and forth, trying it on each vibration. This course will enable us to determine if the fork is in line and the guard pin correct. We have already filed out our fork so the jewel pin works free in the slot, but we have now to remove the stretched ends of the fork as shown at *i i* to allow the jewel pin *g* to pass on the dotted curve *f*, which represents the curve described by the jewel pin in its arc of vibration. This is done on both sides until the jewel pin passes freely in and out of the fork. We have now our actions all complete except our pallet action; this may be too deep or too



shallow or the pallet stones too thin. These corrections have already been discussed. We will now consider the putting in of a new fork in a Swiss anchor of the usual form so as to make a nice clean job. Usually in such jobs we can buy the fork partially fitted and finished with the screw hole for the pallet staff already cut; but it is best not to have the holes for the steady pins drilled. We should try our fork as regards temper. It should not be too hard; this can be determined by filing; if a new sharp file will cut it without glazing it is about right, but if it files too easy it will be apt to bend and not take a fine high polish. A pair of dividers made of a pinion gauge by sharpening the points are very convenient for many purposes, and in this case can be used to establish the guard point *h*, fig. 4. This should be filed to an approximate length by measurements from the old one. In filing the guard point a pair of cutting plyers are the

best instrument for holding the fork as shown in diagram B^* , where F represents the cutting pliers and h the guard point. The file is run on the dotted line l . A fine square file is the kind to use, working with a corner having a safety edge for making the angle at l . I don't mean shaping the guard point as shown in diagram h^{**} , but in filing the angle indicated by $m m$, diagram h^* . The reason for using the safety edge of the file is because it comes to a positive right angle. This will be understood by inspecting diagram E^* , which is a transverse section of a square file enlarged. The angles at $u u$ are supposed to represent the cut angle and the dotted line p the safety side; the angles at $o o$ are perfect, or so nearly so as to accomplish our purpose. The angles at $o o$ can be rendered perfect by grinding the safety side a little. In filing the corner or angle at m we use the safety edge first toward the guard point then toward the fork, working carefully so as to keep the correct form as well as to make a clean angle at m . This feature of a square file should be taken into account in fitting watch hands with square sockets, for how frequently we find minute hands in which the hole has the corners rounded instead of a sharp clean angle exactly fitting the canon pinion. In such hands the hole soon wears and the hand gets loose. For tightening such hands use a ball faced punch on both sides, resting the socket of the hand on a solid stake; if this treatment does not make it fit put on a new one. I beg pardon for the digression, but I thought it a "hint" worth giving, as I have found so many loose minute hands from this cause. By changing the direction in which the fork is held in diagram B^* we can file both sides of the guard point h even after the pallets and fork are attached. After the fork is nearly of the proper size, we add the pallets and screw in the pallet staff. If the steady pins are in the pallets they should be removed. We can now put the fork and pallets into the watch and test for the banking. Of course, as the pallets are only held to the fork by friction we can push them about so the lock is alike on each pallet. We next file from the fork at $r r$, diagram h^{**} , until the lock is correct; then file the guard point so the roller will pass freely; yet the guard point should never pass toward the roller far enough to free the lock on the pallets. After all this is correct we can drill for our steady pins which secure the fork to the pallets. The reader will now see why it is better to have no holes drilled in the fork for steady pins, as in most cases neither of the steady pin holes will come exactly right, and to drill a half hole or even broach it out is not a thing to be desired. If we have no holes except those in the pallets, it is quite easy to use these as guides and drill through the fork. Usually a pair of ordinary hand tongs will clasp the fork and pallets together so as to hold them from getting displaced while drilling. Of course, leaving the staff in to help hold the parts together. We should have a drill of the same size as the holes in the pallets. After the holes are drilled we put in the steady pins. Even in this little effort there is an opportunity to show skill and neatness of mechanical execution. The holes should be countersunk with a round countersink and burnished, making the merest tiny concavity around the hole. The steady pins should be put in from below so the ends just come flush with the upper surface of the fork, and these ends should be burnished round and bright so as to look like two little bright balls of steel in two very small bright cups. The fork should now be taken apart from the pallets and filed to exact shape, leaving the parts proportionate and as light as is consistent with strength. The upper surface should be ground flat on a ground glass slab with oil and oil stone dust until perfectly flat. The upper edges of the fork should be beveled first with a file and then with a round slip of Arkansas stone. A little attention to a nice finished Swiss fork will give the correct idea. After the file marks are all removed by the Arkansas slip, the fork should be well rubbed with soft bread crumb to remove any grit. The beveled edges should now be burnished bright with a small burnisher, going carefully over the beveled parts; finally use a slip of pegwood with diamantine and alcohol to give a bright luster. Now comes the polishing of the flat upper surface of the fork. We have already ground it flat and smooth. For this flat polishing we

need a flat tin or zinc lap, using diamantine and alcohol. By burnishing and polishing the beveled edges of the fork first we obtain a better finish, than if we had first polished the flat top and then polished the beveled edges, because the angles are now sharp and clean and the flat surface not rounded. The fork at l should be ground out with a slip of soft steel and oil stone dust and oil, and finally polished with piece of pegwood cut thin, using diamantine and alcohol. The style of fork shown in fig. 2 never need polishing; if we can only make them run we should be satisfied.

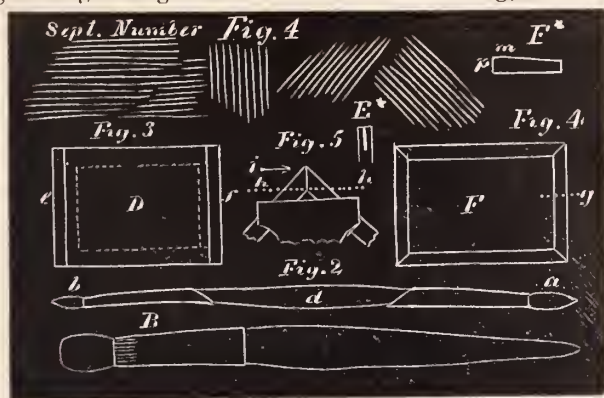
Free Hand and Mechanical Drawing.

BY EXPERT.



THE CUT designated as fig. 4 in September number was omitted in that issue but is given here, and, as the reader will see, is simply parallel lines of pen strokes in different directions. Pen lines have a tendency to commence and end with a dot; this is owing to peculiar antics of the instrument, and are more noticeable when the line is made slowly. Pen drawing can not be executed too rapidly; I mean by this the individual strokes. The "effects," however, can not be too much studied. We should learn to make parallel lines as at fig. 4 in all directions while the paper is lying square in front of us. It is easier to make parallel lines horizontally, using the elbow as a center, and with a sort of swinging motion the hand is swept away from us. Such lines do well for sky effects, but should be avoided as much as possible in early efforts as it is so easy to learn bad habits. It is only after one has, as you may say, mastered the art, they can use lines in one direction and convey a strong pictorial effects. I mention these matters to put the reader on his guard, or it could be expressed in the homely phrase of "set him a thinking;" that is, analyzing the subject. I imagine few of my readers will be very young and need such instruction as would be used for a "kindergarten." Still, art is not a thing to be jumped at and grasped in six easy lessons, as I remember seeing a book which professed to teach French. I do not wish to confine the practice of any person, who might have a desire to learn to draw, exclusively to pen and ink work; it would be much better to vary it with pencil drawing and washes in India ink. A series of experiments or efforts in India ink are very useful to convey the idea of breadth of effect in light and shade. It is difficult to convey the idea of washes in India ink with wood engraving, yet *The Century* magazine gives many fine specimens. It is not the writer's intention to give an extended treatise on the graphic arts, still it is his desire to give such instruction as will enable any careful reader who practices enough to draw creditably. I would say in regard to India ink wash drawing, we prepare our ink precisely as directed for pen drawing, but it need not be so thick and black, and the paper on which the drawing is executed should be a little rough or "have a tooth," as artists express it. We should have a glass of water and an ink slab with about 4 cells, in which we have 4 grades of ink graded by intensity. Commencing with a very light mixture (of water and India ink) which will only stain the paper, the cells gradually darkening in their order until the last cell is almost a black, reserving, the full thick black ink as prepared for pen drawing for the final touches. We should have about 5 pencil brushes of different sizes for such touches as we desire to make. The 5 mentioned would be, 1 large camel's hair (in tin ferule) for skies, size one o; 2 camel's hair No. 2 in quills; 2 camel's hair No. 7 in quills. The one (o) has a handle fitted; the others are mounted on a short (about 4 inch) stick tapering both ways, with a pencil brush on each end. The brushes or pencils so mounted in using, one is for color and the other for water to soften or blend the tints. At fig. 2 are shown the pencils used; A shows two camel hair pencils; $a b$ are the brushes and d the handle; B the large flat camel's

hair brush for broad washes like skies. For wash drawings of all kinds the paper should be wet and stretched on a drawing board. A board for this purpose should have cleats attached at the ends as shown at *ef*, fig. 3. It is something of a trick to stretch a piece of paper nicely on a drawing board, but paper prepared in this way works so much nicer that one hardly feels like neglecting it. To commence with it is best to use pretty thick heavy paper as it works more pleasantly. We should cut such a sized piece as we want, leaving a margin larger than our intended drawing; we thoroughly



wet the piece with a soft sponge. We should have prepared at the same time some good glue. The glue should be rather thick, even when hot, almost as thick as molasses; we now paint with a small (about $\frac{1}{4}$ of an inch thick) bristle brush, all around the extreme outer edge of the paper, a strip of glue $\frac{1}{2}$ an inch wide. We quickly place the paper with glue side next our drawing board, and by means of several thickness of old newspapers—these papers should be free from folds and creases, as they are intended as an elastic cushion to hold the wet drawing paper firmly pressed to the drawing board until the paper dries. Over the old papers should be placed another board, when by means of weights we press the boards together. The drawing board *D* is best laid flat on a table with the drawing paper up—books or anything having weight evenly distributed over the upper board will hold the paper in place until it dries, which will require a couple of hours. For all large drawings paper should be stretched on a frame. It is not necessary to have a stretcher or frame with tenons at the corners as oil painters use for their canvasses, but a simple square frame as shown at *F*, fig. 4. One precaution should be used in making such frames, and this is, the inner edge of the frame should be made thinner, as shown at diagram *F*, which shows a section of the frame at the dotted line *g*, fig. 4. A person of any wood working ingenuity can easily make such frames for themselves. The corners are mitered together, and the joining is easily effected by sawing the pieces in a miter box and putting a joint to be united into a vise as shown at fig. 5, and saw through on the dotted line *h* with rather a thick saw. At diagram *E* is shown how the saw kerf looks when seen in the direction of the arrow *i*, fig. 5. Into this saw kerf we draw a piece of straight grained holly wood or maple veneer with glue. By putting glue between the pieces *ii* and also gluing the veneer we can get a strong joint. Our paper should be wet and glued to the outer edge of the frame at *p*, diagram *F**. In order to work on paper so mounted we should have a panel of thin board which goes in at the back. If we are going to frame any drawings for display such stretchers as shown in fig. 4 are very desirable, as they hold the paper flat and tense. We would probably use but two or three sizes of stretcher, and could keep panels to put in back of the paper to hold it firm while working. And for washing in skies and any kind of brush work such stretchers hold paper elegantly. I would beg to call the attention of persons who desire to learn to draw to practice on large drawings; it is of great benefit. Mount a sheet of drawing paper in this way, say, 18x24 inches, and essay a drawing in charcoal. The charcoal comes in little sticks 6 or 7 inches long. Set the frame and paper with panel back on an easel as for oil painting and copy some picture or engraving, keeping your charcoal sticks sharp as possible. Don't allow yourself to hurry

or to judge of the work until the drawing is complete. You must work where there is nothing to shake or disturb the paper, for the dust of the coal which forms the picture will be dispersed by a breath even. After the drawing is made we can apply weak shellac varnish to the back of the paper and make it permanent.

Opals Restored to Fashion by Queen Victoria.



QUEEN VICTORIA has made the opal fashionable again. All the gifts of jewelry that she has bestowed among her friends for the past year have been opals. Some times they have been set alone, sometimes set with diamonds, but in every instance they have been there. The Queen has always had a penchant for these alleged unlucky stones. She has insisted that they brought no more bad luck to those wearing them than any other jewels, and she has long tried to allay that superstition. Her rather profuse distribution of these stones among her friends, it is said, had for its object the doing away with the superstition altogether.

The Queen's own jeweler naturally took the hint, and the other jewelers who were not the Queen's own, but who were more than willing to be, were not slow in perceiving that there was a ready sale for the very gems that had been heretofore looked upon with suspicion. So they made up into rings, pins, and in other ways all they had in stock, and sent out for more. Thus it wasn't very long before every blooded English lady or gentleman who wore jewelry at all, sported many and beautiful opals. Then it wouldn't be English, you know, if the blooded Americans didn't have a lot of opals, too, and though President Cleveland didn't have any "own jeweler," to set the opal a rolling, there were lots of jewelers who did. There wasn't a very big stock of opals in these parts, so orders were sent to Hungary, the great opal market, to rush on here the best they had. Then opals went up. To-day they are 100 per cent. higher than they were a year ago. Good ones sell for \$55 a carat, and increase in price in almost the same ratio as diamonds. Of course small and inferior stones can be bought as low as \$5 a carat, but they are not a bit pretty. The big jewelry houses are working them into all sorts of jewelry, and are very sad because they can not get as many as they want.

The jewelers and precious stone dealers of the eighteenth century who had invested largely in opals, were nearly thrown into bankruptcy by Sir Walter Scott, who, in one of his Waverly novels, pretty nearly ruined the opals reputation forever, and it is said that many jewelers of the present day cherish resentment against that great novelist on account of the injury that he did to their forefathers, and will not allow any of his works on their library shelves. The ancients had called the opal the "love stone," and no blooded young Roman or Greek would have even faintly considered engaging himself in marriage if he hadn't an opal ring for the girl. And any ancient who had a very choice opal at once became proud, and looked down on the other ancients who wasn't so fortunate.

Indeed, there are strange stories told of these men of old, and their opals. It is chronicled in the encyclopædia, which took the facts straight from the old records, that a Roman senator named Nonius had an opal that made all the other opals in those parts pale. One day Marc Antony happened to see it, and he wanted it for himself. He intimated to the senator that it would not be a bad scheme to make him a present of it. But the senator didn't see it in that light. Then Antony said he would have to give him that opal or be banished, Nonius replied that he would be banished, then, and left the country with his opal, all his other goods having been confiscated. The ancient Pliny, who saw this opal, says that it was worth Roman money equivalent to \$500,000.

When Sir Walter Scott wrote that novel—it was "Anne of Geierstetn"—and told about the Baron Von Arnheim, who had an opal that occasionally got angry and flashed red fire, the opal market

dropped at once. That opal worked too much mischief not to ruin the reputation of its family. Its first little eccentricities weren't so much, but its wind up was very bad. The Baron had wedded a beautiful Persian maiden, and for a year or two, while that opal was behaving itself, affairs went smoothly enough.

Then the Baron and his wife, along with their relatives and friends, went to church to have their baby christened. It was all right until a drop of holy water fell on that opal. There was a sizzle, and a lot of red fire darted out of the opal, which at once became as dull and lustreless as a piece of a dinner plate, and it wasn't long after this that the Baron and Baroness died.

After reading that story nobody cared much for opals; and it would have been hard to find a girl who would have consented to have one in her engagement ring. Apparently Queen Victoria doesn't believe the story, or superstition isn't as strong as it was. At any rate, the latest engagement ring will contain opals.—*N. Y. Sun.*

The Lever Escapement.



REVIEW of the different watch escapements is highly instructive, and an astonishing amount of ingenuity has often been put forth in their construction, nevertheless, practice has proven that all except four, to wit; the verge, cylinder, anchor or lever, and chronometer escapements, are unreliable. The verge is fast becoming obsolete, and only the last three are left. The escapement most universally used to-day is the anchor or lever, and is claimed to be an English invention, said to have been made in 1770, by Mr. Thomas Mudge; others accredit it to Tampion, and date its invention to 1695. The Swiss claim the invention as their own. It is very possible that it was invented simultaneously about the same time in England and Switzerland, and although the general form and principles to day are the same, they varied largely about 100 years ago, and the Swiss construction rightfully deserved the name of "anchor escapement," from its peculiar form, while the English called their's, with every show of reason, "lever escapement;" both appellations are still dominant in these two Countries.

We borrow the description and action of the escapement from the excellent work on watchmaking by Mr. F. J. Britten, omitting the engravings, as every watchmaker is so thoroughly acquainted with the functions and performance of the parts that an illustration is unnecessary. The cut shows the most usual form of the English lever escapement, in which the pallets scape over three teeth of the wheel. A tooth of the escape wheel is at rest upon the locking-face of the entering left-hand pallet. The impulse pin has just entered the notch of the lever and is about to unlock the pallet. The action of the escapement is as follows: The balance which is attached to the same staff as the roller, is traveling in the direction indicated by the arrow, which is around the roller, with sufficient energy to cause the impulse pin to move the lever and pallets far enough to release the wheel tooth from the locking-face, and allow it to enter on the impulse face of the pallet. Directly it is at liberty, the escape wheel, actuated by the mainspring of the watch, moves round the same way as the arrow, and pushes the pallets out of its path. By the time the wheel tooth has arrived at the end of the impulse face of the pallet, its motion is arrested by the exit or right-hand pallet, the locking-face of which has been brought into position to receive another tooth of the wheel. When the pallet was pushed aside by the wheel tooth, it carried with it the lever, which in its turn communicated a sufficient blow to the impulse pin to send the balance with renewed energy on its vibration, so that the impulse pin has the double office of unlocking the pallets by giving a blow on one side of the notch of the lever and of immediately receiving a blow from the opposite side of the notch. The balance proceeds on its excursion, winding up, as it goes, the balance spring, until its energy

is expended. After it is brought to a state of rest, its motion is reversed by the uncoiling of the balance spring, the impulse pin again enters the notch of the lever, but from the opposite direction, and the operation already described is repeated. The object of the safety pin is to prevent the wheel being unlocked except when the impulse pin is in the notch of the lever. The banking pins keep the motion of the lever within the desired limits. They should be placed where every blow from the impulse pin on to the outside of the lever is received direct. They are sometimes placed at the tail of the lever, but in that position the locking pins receive the blow through the pallets, staff pivots, which are liable to be broken in consequence.

The escape wheel has fifteen teeth, and the distance between the pallets, from center to center, is equal to 60° of the circumference of the wheel. The pallets are planted as closely as possible to the wheel, so that the teeth of the wheel, in passing, just clear the belly of the pallets.* The width of each pallet is made as nearly as possible half the distance between one tooth of the escape wheel and the next. As the teeth of the wheel must be of an appreciable thickness and the various pivots must have shake, it is not found practicable to get the pallets of greater width than 10° of the circumference of the wheel instead of 12° , which would be half the distance between one tooth and the next. This difference between the theoretical and actual width of the pallet is called the "drop." The lever is pinned to the pallets, and has the same center of motion. The distance between the center of the lever and the center of the roller is not absolute. The distance generally adopted is a chord of 96° of a circle representing the path of the tips of the escape wheel teeth, that is the distance from the tip of one tooth to the tip of the fifth succeeding tooth. The proportion, as it is called, of the lever and roller is usually from 3 to 1 to $3\frac{1}{2}$ to 1. In the former case, the length of the lever (measured from the center of the pallet staff to center of impulse pin or mouth of notch) is three times the distance of the center of the impulse pin from the center of the roller, and in the latter case $3\frac{1}{2}$ times. The portion of the lever to the left of the pallet-staff hole acts as a counterpoise.

In this form of the lever escapement the pallets have not less than 10° of motion. Of this amount 2° are used for locking, and the remainder for impulse. The amount of locking is to some extent dependent on the size of the escapement. With a large escapement less than $1\frac{1}{2}^\circ$ would suffice, while a small one would require more than 2° . The quality of the work too, is an element in deciding the amount of locking. The lighter the locking the better, but it must receive every tooth of the wheel safely, and where all the parts of the escapement are made with care the escapement can be made with a light locking, 10° pallets, with a lever and roller 3 to 1, give a balance arc of 30° that is to say, the balance in its vibration is freed from the escapement except during 30° , when the impulse pin is in contact with the lever.

Presuming that the staff hole is correctly drilled with relation to the planes, a rough rule for testing 10° pallets is that a straight edge laid on the plane of the entering pallet, should point to the locking corner of the exit pallet.

When from setting the hands of a watch back, or from a sudden jerk, there is a tendency for the pallets to unlock the safety pin butts against the edge of the roller. It will be observed that when the impulse pin unlocks the pallets, the safety pin is allowed to pass the roller by means of the crescent which is cut out of the roller opposite the impulse pin. The teeth of the escape wheel make a considerable angle with a radial line (24°), so that their tips only

*When the tooth is pressing on the locking, the line of pressure should pass through the center of the pallet staff. But as the locking-face of the two pallets are not equidistant from the center of motion, a tangent drawn from the locking corner of one pallet would be wrong for the other, and as a matter of fact, if a diagram is made it will be found that even when the pallets are planted as close as possible they are hardly as close as they should be for the right-hand pallet. To plant as close as possible is therefore a very good rule and is the one adopted by the best pallet makers.

touch the locking-faces of the pallets. The locking-faces of the pallets, instead of being curves struck from the center of motion of the pallets, as would be otherwise the case, are cut back at an angle so as to interlock with the wheel teeth.† This is done so that the safety pin shall not drag on the edge of the roller, but be drawn back till the lever touches the banking pin, when the operation of setting the hands back is finished, or the other cause of disturbance removed, the pressure of the wheel tooth on the locking-face of the pallet draws the pallet into the wheel, as far as the banking pin will allow. The amount of this "run" should not be more than sufficient to give proper clearance between the safety pin and the roller, for the more the run, the greater is the resistance of unlocking. This rule is sometimes sadly transgressed, and occasionally the locking is found to be, from excessive run, almost equal in extent to the impulse. It will generally be found that in these cases the escapement is so badly proportioned that the extra run has had to be given to secure a sound safety action. In common watches the safety action is a frequent source of trouble. The more the path of the safety pin intersects the edge of the roller the sounder is the safety action, and if the intersection is small the safety pin is likely to jamb against the edge of the roller, or even to pass it altogether. With an ordinary single roller escapement, a sound safety action cannot be obtained with a smaller balance arc than 30° . Even with a balance arc of 30° , the roller must be kept small in the following way, to insure the soundness of the safety action. The hole for the impulse pin must not be left round. After it is drilled a punch of the same shape as the impulse pin—that is with one-third of its diameter flattened off, should be inserted, and the edge of the roller, where the crescent is to be formed, beaten in. By this means the roller can be turned down small enough to get a sufficient intersection for the safety pin.

It is useful in estimating the balance arc of a watch to remember if it has a three-armed balance that 30° is one-fourth of the distance between two arms. With a compensation balance a third of the distance between two of the quarter screws is 30° .

A round impulse pin, although it is sometimes used in common watches, gives a bad action and necessitates a very large balance arc.

A Young Mechanic's Working Capital.



THE increase of capital as ordinarily reckoned—money saved and prudently invested—is not at present under consideration. Every workshop proves beyond the need of discussion that by industry, thrift, and the avoidance of wasteful habits, to-day nothing of more reprehensible habits, it is possible for any, even the lowest paid, workman to put by something, and thus, however slowly, accumulate a reserve which may be used as a money capital when opportunity serves. The industries of the country are so full of evidences of this fact, that it need not be insisted on here. Let us consider rather some of the means by which wage earners (particularly those whose mental and manual habits are not set by age) may increase their working capital more effectively and rapidly than by any possible saving of wage money. By working capital we mean whatever adds to the productive value of a man's time, and increase his income without requiring any increase in the duration or severity of his labor. The intelligence or trustworthiness which causes one laborer to be selected from a gang to oversee and direct the work of his mates, with an addition of a half a dollar a day to his wages, is productive capital just as much as money at interest yielding an equal sum a day. From two to five years' earnings of our laborer, saved in bulk and securely invested, would add no more to his income than those qualifications which gained for him his slight though materially valuable promotion. And almost any young man can add fifty per cent, may be five hundred per cent, to his income by increasing his

worth to an employer, easier than he can save the equivalent of even one year's wages.

Accordingly, while we would not decry in any way the good advice usually given to young men beginning life as wage earners, "Save money for future capital," we would emphasize this collateral advice: "Improve your spare time, as the quickest way to make capital."

A young man of ordinary capacity does not have to work long at any mechanical art before he can earn a dollar a day. He need not be very strong, or very skillful, or very intelligent to be worth that. An income of a dollar for each working day is equal to the interest on \$10,000 in United States 3 per cent bonds, or \$7,500 in 4 per cents, or \$5,000 at legal interest in the majority of the States. That is the value of the common laborer's working capital—that is, his ability to do an average day's work at rough or unskilled labor three hundred days in a year, coupled with a willingness to do such work.

Our young mechanic, we will suppose, very properly aspires to be something better than an unskilled laborer. How can he most surely win promotion and a more liberal income? Tied down and hampered every way by the necessity of daily toil, it may seem to him that the doors of advancement, for the moment at least, are closed against him; and without a struggle to better his position he may drift along, waiting for an opportunity that may never come. Or he may quietly set to work to increase his capital by trying to fit himself for a better paying grade of work.

This is usually the most obvious and the easiest thing to do. By steadily trying to do the work he has to do a little better or a little quicker, and by closely observing the working methods of the more skillful men, he can usually add rapidly to his productive capital. When he has fitted himself to earn half a dollar a day more, he has accomplished as much as if he had increased his deposit in the savings bank by the handsome sum of \$5,000. And his increased skill is quite as secure an investment and quite as well worth working for as so much money on deposit. So, too, a good handwriting or a knowledge of simple accounts, which any young mechanic can acquire by evening study and practice in a single winter, may easily secure his promotion to a position worth half a dollar a day more than he could earn as a mere laborer. A patient study of mechanical drawing furnishes a still more rapid means by which a young mechanic can increase his working value, in other words, his productive capital.

When our young mechanic has added to his knowledge and skill enough to make his services worth two dollars a day to an employer, he may fairly reckon that he has added \$10,000 to his capital. And on this reasonable basis it is manifest that, of two young workmen of equal capacity, the one who—making no effort to improve himself—should have placed to his credit in bank \$5,000 a year for five years, would not be so well fixed for life as his companion who should devote his spare time rigorously to the work of increasing his practical and technical knowledge of his trade and its associated arts, while endeavoring during his working hours to excel himself as a skillful and conscientious workman. A capital of \$25,000 in cash is not to be despised; but it will not earn so much for a man as the knowledge, skill, and mental and moral discipline which our studious, faithful, and wide awake mechanic might acquire. There is nothing that men pay for more liberally than ability and sterling character; and there is no way by which these may be got and demonstrated so quickly and surely as by the habit of doing one's best at all times, with the habit of seeking useful knowledge during those hours of leisure which so many young men waste in idleness or worse.

The means most admirable for self-culture necessarily vary with the requirements of each seeker for such increase of working capital. A few are of almost universal utility, among them these: Practice in writing and drawing, particularly drawing; the study of arithmetic and bookkeeping; the study of elementary physics, chemistry, and mechanics; critical observation of machines and mechanical pro-

†The locking-face forms an angle of 6° or 8° with a tangent to a circle representing the path of the locking-corner.

cesses: attentive reading of the literature of your special trade or calling; independent experimental work, machine construction, and invention, and so on. Begin where you are, with whatever lies readiest at hand. With pluck, patience, and a determination to succeed, the most exacting and difficult arts and sciences have been mastered by men most unfavorably situated. And never forget that the habit of overcoming difficulties is the most valuable and productive element of any man's working capital.

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of August 17, 1886.

- 347,555—Button or Stud, Collar or Cuff. R. Benedict, West Brighton, N. Y.
 347,399—Clock and Indicator System, Electric. T. C. H. Vance, Louisville, Kentucky.
 347,528—Clock Hand and Dial, Illuminated. E. Speer, Passaic, N. J.
 347,737—Clock Movement. H. P. Pruin, Grand Haven, Mich.
 347,572—Clock System, Electric. C. L. Clark, East Orange, N. J.
 347,337—Timepiece Dial. M. B. V. Ethridge, Boston, Mass.
 347,450—Watches, Stem Setting Mechanism for. A. Troller, Rockford, Ill.
 10,756—Watch, Stop. J. Tixier, San Francisco, Cal.

Issue of August 24, 1886.

- 347,994—Watch Case Pendant. D. H. Church, Newton, Mass.
 347,886—Watch, Stem Winding. L. B. Norcross, Birmingham, Iowa.
 348,009—Watch, Stem Winding and Setting. G. S. Heath and A. F. Champlin, Hartford, Conn.

Issue of August 31, 1886.

- 348,299—Engraver's use, Block for. E. S. Stehman, Lancaster, Pa.
 348,449—Eye-glasses. D. V. Brown, Philadelphia, Penn.
 348,202—Watch Cases. A. Grandjean, Cincinnati, Ohio.

Issue of September 7, 1886.

- 348,915—Clock Striking Mechanism. F. Klinkermann, Dillsborough, Ind.
 348,811—Swivel for Watch Chains. A. Abrahams, East St. Louis, Mo.
 348,620—Watch Crowns, Manufacture of. A. C. Dalzell, Newport, Ky.
 348,645—Watches, Game Attachment for. J. Walzer, Chaux-de-Fonds, Switzerland.

Wedding Rings.



IN "SWINBURNE'S Treatise of Spousals" we read: "The first inventor of the ring, as is reported, was one Prometheus. The workman which made it was Tubal Cain. By the counsel of our first parent, Adam gave it unto his son to this end, that therewith he should espouse a wife, like as Abraham delivered unto his servants bracelets and ear rings of gold. The form of the ring being circular—that is, round and without end—importeth thus much,

that their mutual love and beauty and affection should roundly flow from the one to the other, as in a circle, and that continually and for ever." The following, on the marriage ring, in Hewick's "Hesperias," is well expressed:

" And as this round
 Is nowhere found
 To flaw or else to sever,
 So let our love
 As endless prove,
 And pure as gold for ever."

Vallancy, in his "Collectaneu," says that "there is a passage in Ruth, chap. iv., v. 7, which gives room to think the ring was used by the Jews as a covenant." Chilmead, who flourished in 1650, speaking of the rites and customs of the Hebrews at that period, says that before the wedding agreement is signed, "The bridegroom putteth a ring upon her fingers in the presence of two witnesses, saying, 'Behold thou art my espoused wife, according to the custom of Moses and of Israel.'" Levinus Lemnius tells us, speaking of the ring-finger, that "a small branch of the arterie, and not of the nerves, as Fellius thought, is stretched forth from the heart unto this finger." This ancient opinion has been exploded by the anatomists of modern times. The supposed heathen origin of our marriage ring had well nigh caused the abolition of it during the time of the Commonwealth. The sarcastic author of Hudibras gives us in the following lines the reasons why the Puritans wished it to be set aside:

" Others were for abolishing
 That tool of matrimony, a ring,
 With which th' unsanctified bridegroom
 Is married only to a thumb,
 (As wise as ringing of a pig
 That us'd to break up ground and dig);
 The bride to nothing but her will,
 That nulls the often marriage still."

Columbriere, speaking of rings, says: "The hieroglyphic of the ring is very various. Some of the ancients made it to denote servitude, alleging that the bridegroom was to give it to his bride to denote to her that she is to be subject to him." Many married women are so rigid in their notions concerning their wedding rings that neither when they wash their hands, nor at any other time, will they take it off their finger. The reason ascribed is on account of the expression in the wedding ceremony—"Till death us do part." A custom worth noticing at weddings is that slices of bridecake are put through the wedding ring. They are afterwards laid under pillows at night to cause young persons to dream of their lovers. Douce says: "The pieces of the cake must be drawn nine times through the wedding ring." In the *St. James' Chronicle*, 1799, are the following on the wedding cake:

" When from the altar comes the pensive bride
 With downcast looks, her partner at her side,
 Soon from the ground those thoughtful looks arise
 To meet the cake that gayer thoughts supplies.
 With her own hand she charms each destined slice,
 And thro' her ring repeats the trebled thrice,
 The hallowed ring infusing magic pow'r,
 Bids Hymen's visions wait the midnight hour;
 The mystic treasure plac'd beneath her head
 Will tell the fair if haply she may wed."

The singular custom of wearing wedding rings appears to have taken its rise among the Romans. Before the celebration of their nuptials there was a meeting of friends at the house of the lady's father, to settle articles of the marriage contract, when it was agreed that the dowry should be paid down on the wedding day or soon after. On this occasion there was commonly a feast, at the conclusion of which the man gave to the woman, as a pledge, a ring, which she put on the fourth finger of her left hand, because it was believed that a nerve reached thence to the heart, and a day was then named for the marriage.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

THE dull season in the retail houses of this city is past, and while it cannot be said that the busy season is at its height, it has begun with a vim and earnestness that indicates a strong revival of the jewelry business. Already the show windows are dressed with new ornaments, while novelties are in the show cases for inspection and approval. Old favorites are out in new dress, and staple articles and specialties are finished in approved styles.

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THIS revival is characterized by the manufacture and exhibition of larger and more varied stocks of jewelry than have been seen before in some years; jewelry that has its value enhanced by elaborate and careful handiwork as well as with gems and precious metals. The tendency to more ornate styles in personal ornaments, before alluded to, is all the while growing, as is the disposition on the part of patrons to wear a greater profusion of jewelry.

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THE lavish display of gold jewelry of all kinds is one of the promising signs of the times. By gold jewelry is here meant ornaments that do not depend on gems or colored enamels for their attractiveness, but which are made of gold and gold only. The new models in this gold jewelry partake of animal forms, insects, birds and flowers, and the surface is varied with bright and dull finish, and by engraved and chased work. The chased finish is a popular one, and the rope and twisted wire patterns are of frequent occurrence in new goods. Pins bound to find favor consist of an elongated loop of gold wire, a coil of rope or a loose knot formed of gold rope. Filigree and pierced gold work are growing in popularity. An attractive pattern seen in brooches and sleeve buttons for ladies consists of a wheel or rim of plain gold filled in with filigree or pierced gold.

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WITH the growth of all gold goods there appears no diminution in the demand or production of fine enameled jewelry. All the show cases exhibit it and ladies' jewel cases are incomplete without it. The above remark holds true also of gem jewelry. It is as popular as ever. The truth is, the revival of jewelry is so complete and extended as to make room for all classes of ornaments.

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THE international yacht races have not been without an influence on the trade. These have given a decided impetus to the manufacture and sale of marine subjects in both silver and gold. Scarf pins and sleeve buttons for gentlemen and lace pins for ladies, give miniature representations in precious metals and enamels of the contesting yachts. One manufacturer has gone so far in this direction as to produce "Mayflower" jewelry, including sleeve buttons, lace pins and corsage pins. In watch chains a newcomer is introduced as the yachting chain, and, it must be confessed, this is decidedly attractive in appearance. The chain is of gold in rope pattern with pulleys for slides, and an anchor or other nautical object for a pendant.

THE racing season has also left its impress in way of pendants, buttons and scarf pins in horse shoe pattern, with gems for nails. Link buttons in platinum and gold show one button as a gold horse shoe and the other as a platinum nail. Other jockey subjects in popular jewelry are stirrups crossed with nails, horse heads in London crystals set in either gold or silver mountings, and jockey caps of moonstone. Other outdoor sports are represented by tiny pistols, guns, tennis, racquet and ball, cricket bats and the like.

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ENTIRELY new and very graceful are floral pins that represent bunches and sprays of flowers with long flexible stems. The first seen were in mourning jewelry, where the flowers were of black enamel and the long stems of gold, but these pins are now in the show cases in a variety of hues. A beautiful specimen seen represented several sprays of lilacs. These ornaments, while fastened on by means of a pin of ordinary length and catch underneath, measure from the extreme tip of flowers and stems as many as four inches, and yet they are exceedingly dainty and modest in effect, for nearly or quite one-half of this length consists of graceful gold stems that much set off and enrich the enameled flowers.

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AMONG new devices for evening wear, to be placed in the coiffure and in the bodice of a dress, are a series of diamond swallows quite small and in groups of three or five. There is also a growing fancy for all sorts of insect ornaments, such as butterflies, dragon flies and the like, both in all gold pins and in gems. Many of these are made to fasten with a short pin and catch, and serve not only to group on dresses and in the hair, but to wear on bonnet ties and neck ribbons as well. The new fly ornament previously described, and which will be on the market by the time this number of THE CIRCULAR reaches its readers, will doubtless prove a favorite among these insect ornaments. This newcomer, as many will remember, does away with the pin attachment, and fastens itself by means of little gold prongs that are opened and shut through a mechanical contrivance hid away in the body of the fly. Specimens recently seen included moths with enameled wings, gem butterflies and all gold flies.

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WHEN two or more birds or winged insects are grouped in one ornament, the disposition is to set these so that the bar or base of the pin to which the objects are attached will not show, in order that the birds or flies shall present the appearance of having just alighted on the hair or dress, not of being fastened there.

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PARISIAN eccentricities and novelties are sandwiched in among new things of American manufacture, giving patrons the benefit of a very extended choice in the selection of personal adornments. There are mother-of-pearl and shell scarf pins that simulate sparrows, parrots and cockatoos, squirrels, cats, frogs and mice in gold and enamel, to say nothing of such expensive fancies as a wicker basket of gold wire filled with pearls, in representation of a basket of eggs, to be worn as a brooch. The gold and silver nursery pins, with a gem or other ornament in one end, which have had a popular run in Paris, are also seen here, and some ladies are wearing these to fasten more closely about the neck the standing collar or band of their dress. These pins are made of light gold wire and fasten with a catch underneath after the manner of an ordinary nursery pin.

NUMBERED with Parisian novelties that have found their way to the show cases of our city jewelers are automatic brooches, in flower patterns, which open and shut their petals, affording first a bud and then a full blown rose, and then a bud and so on *ad libitum*. Another sample of mechanical jewelry of French origin is a little bird with gem set wings which flutter back and forth. These fancies serve a good turn in the shop windows by attracting attention to other and more enduring styles, just as does a live maquech bug that travels back and forth the length of the tiny gold chain attached to the little gold harness with which it is dressed.

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THE mention of these and similar eccentricities one sees in the shop windows nowadays, leads in turn to a mention of the attractive and lavish display of goods indulged in by our foremost jewelers and silversmiths; displays in which much money and no end of ingenuity and taste are expended. Nor is this all; these same jewelers bend every energy to first discover what best pleases their patrons, then they set to work to gratify them. Not only are the wants of the public promptly responded to, but their foolish and fickle whims as well. If fanciful tendencies are indicated all sorts of novelties are introduced. If the whim be for realistic effects, objects animate and inanimate are faithfully copied. If there is an inclination to run after specialties, then specialties are turned out in endless quantities; is there a desire for the grotesque, immediately is the brain of the designer racked for eccentricities, and so on through the everchanging fashions that control these things.

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FORTUNATELY while some are always ready for bizarre effects and striking novelties, the present disposition is for that better class of workmanship with artistic designs and delicacy of finish which characterizes ornaments that never can go quite out of style, on the principle that a "thing of beauty is a joy forever." Our best manufacturers are turning out ornaments sufficiently attractive and meritorious in design and finish to remain in use many seasons, regardless of passing fancies that push novelties in and out of style.

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ONE feature of the season is the revival of old models. Instances are to be seen in watches that copy, in form, at least, timepieces carried by court beauties two hundred years or more ago, and cuff buttons and pins that found their models in British museums.

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WITH the revival of other old time favorites it appears possible that cuff pins will again come into general use. That there is a necessity for these or some similar contrivance every lady who wears linen cuffs can testify, and the wonder is that so needful an article was ever dropped. There are few things more trying to the feminine temper than the shooting out of a stiff cuff over the hand, and the jaggging into the flesh of a pin point with every sudden movement of the arm.

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NEW advocates for favor in form of cuff pins are fashioned after the old models, which of late years have figured in stock under name of "baby pins," because used for the purpose of keeping in place

infants' bibs and little peoples' collars. The chief difference between the new and old cuff pins is that the former is bent a little so as to present a slightly convex surface that fits the curve of arm and sleeve. All gold cuff pins are in the show cases of leading houses this fall; some are chased, some are finished in enamel, and others are formed of twisted wire or rope pattern. Tiffany & Co. are offering them, not only in the styles described, but set with diamonds and rubies. The fact that the cuff pin, like the old bar pin, is a utility affair, serving equally well for lace, bonnet and ribbon ornaments, when not required for confining the cuffs in place, is a big argument in its favor.

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PENDANTS of all kinds remain in favor, and under the chaperonage of these has returned the long-lost locket of other days. The new lockets, as well as the pendants, are now fashionably worn suspended from a light gold neck chain or strand of gold beads. In this connection attention is attracted to the increased popularity of gold and silver beads worn in from one to many strands close about the neck, also to the increased use of gold neck chains, all of which only verifies our predicted return of neck ornaments. There remains hardly a doubt but that gold necklaces will soon make their appearance. An evening toilet is not complete without a necklace or collarette of some sort. Everybody cannot afford a strand of pearls or diamonds; it is this class that are taking so kindly to gold and silver beads, and who will welcome light and graceful necklaces of gold.

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A FAVORITE necklace consists of several strands of beads fastened tight about the neck, after the fashion of a dog collar. A pearl necklace belonging to a set made to order recently for a young bride of this city, consisted of seven strands of pearls that formed, when clasped in place, a wide band of milky white, exhibiting the peculiar luster that characterizes fine specimens. The set included, in addition to this necklace, a brooch simulating the *fleur-de-lys* in outline, and thickly studded with small diamonds that formed a brilliant background for four magnificent pearls grouped in the center. A bracelet set with pearls also appeared in the set, as did a finger ring with a knife-edge shank, the overlapping ends of which were each set with a fine pearl. The pearls in this ring, had the bride worn ear ornaments, would have furnished a pair of solitaire ear rings.

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GOLD and silver beads continue to find favor with ladies who cannot afford gem necklaces, and prefer the real article to imitations. Bead bracelets, especially in silver, are much worn, while the bead pattern figures conspicuously in both gold and silver trinkets of all kinds. A new bracelet shows alternate beads of gold and platinum. Both stiff and flexible bracelets are worn. The graduated link bracelet, with and without gems, continues a desirable article.

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EAR rings, which are again fashionable, show a variety of designs, the most stylish of which, at the present time, are hoops and balls. The hoop rings in turn furnish many patterns from which to select. There are plain gold hoops, knife-edge hoops, filigree bands, hoops of twisted pattern, a hoop of gold beads and circlets of pearls, diamonds and other gems. Then there are gold ear rings of circular

form showing a crescent of filigree. Medium sized ball ear rings come in filigree balls with and without small gems, in gold balls chased and in balls decorated with raised wire work. The newest and by all means the most distinguished ball ear rings, are those of large size richly chased, and designed to wear with a ball brooch similarly finished. This ball set presents a decidedly stylish and unique effect in all gold heavily chased, and, of course, becomes a very handsome ornament when set with fine gems. An attractive hoop ear ring is of gold and represents a dragon, the tail of which forms the circlet, while the head with a ruby for an eye appears as the center of the ornament.

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THIS ball set is only one of many indications that point toward the revival of sets in jewelry. By sets is no longer meant ear rings, pin, bracelet, etc., of strictly uniform size and finish, but brooch and ear rings that harmonize in effect when these do not absolutely "match." An instance at hand are the brooch and ear rings in snowball pattern, the color of the flower being simulated in enamel. Still another example are the floral pins and rings in which are copied daisies, violets and other favorite blossoms. Very beautiful, too, are the miniature enamel paintings set in a circlet of pearls or brilliants, tiny ones forming the ear rings and one of medium size being mounted as a brooch.

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THE daily journals are agitating the question of a gradual transformation of the dress suit, and one has gone so far as to predict that in the near future a swell's wardrobe will include knee breeches with the accompanying appendages of jeweled buckles. This question THE CIRCULAR leaves for time to solve, but autumn fashions for men verify its predictions of last spring in regard to lower cut coats and waistcoats in business suits, and, in consequence, the gradual diminution of scarfs in favor of small neckties and exposed shirt fronts. Tailors who cater to an exclusive fine trade are making both frock and sack coats with the roll a little longer, while waistcoats are longer and open at least an inch lower for fall wear. All this means an increased use of shirt studs for men's wear, and leads to a consideration of the new buttons of which there is a large influx.

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GOLD studs are again fashionable, and are out in all the varieties of finish that characterize other lines of gold jewelry. Some are chased, some show a dull and some a bright finish. For evening wear are balls of moonstone set in gold rims and moonstone balls showing no gold. There are pearl studs and diamond studs, and white enameled ones with and without a gem in the center.

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LADIES, who are ever the jewelers' best patrons, have during the past six months done much to boom both scarf pins and studs, and no longer discriminate between these articles as made for either sex, but select what pleases best regardless of the original intention of the manufacturer. Everybody will be glad to learn that Dame Fashion has decided in favor of chemisettes and cravats with wool dresses for the autumn months, for this insures a continued patronage of these two articles with which the shops abound.

IN SLEEVE buttons the single button and the link are running a neck to neck race. Some manufacturers claim that the regular button for men's wear is the winning one; others claim an increased demand for the link buttons. The true facts in the case, so far as the retail trade in this city is concerned, appears to be that the younger men—especially the so-called swells and dudes—affect, without exception, the link buttons, while elderly and middle-aged men, many of them, incline to the single button, especially when it is provided with a patent back.

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PEARL buttons with gold and silver links, and resembling in size and form the buttons worn in summer vests, are being affected by young men who lay claim to correct style in matters of dress.

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THE Queen continues to be the leading style in watch chains for ladies' wear, and it appears this season in more ornate patterns, with decorative effects and enrichments of gems. The principal change, however, from the original chain, lies in the pendant, which is now a locket, a tiny pencil, a vinaigrette or charm of unique form and finish, rather than a cube or ball.

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FOR men's wear, the double or Charles Dickens chain is in favor, with a locket, seal or other pendant swinging from the center. Fancy vests, both in single and double strands, continue fashionable, and the chains made of platinum and gold are preferred by many. The tendency to seal charms and locket is very apparent.

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IN WATCHES the preference is now given to decorative cases, and in many instances the dials are also ornamented. Ladies are wearing open faced watches again, which accounts in part, perhaps, for the decorative dials and hands. Enamel plays an important part in the ornamentation of watches and so do small gems; the raised wire work is also popular. Richly chased cases are another desirable style.

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HAIR ornaments continue fashionable; a favorite form is a tortoise shell, gold or silver pin, mounted with an adjustable ornament. This ornament is made in nearly or quite all of the models that appear in neck pins, such as balls, coils of rope, crescents, stars, horse shoes, butterflies and the like.

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IN MOURNING goods there are many exceedingly beautiful designs. Some of these are carried out in black onyx, which, by the way, like fine English crape, is always in fashion, and some of it is finished in black enamel. In the exclusive fine goods, especially where floral patterns are employed, pearls and diamonds are much used for the enrichment of the jewelry. For gentlemen's wear are mourning scarf pins simulating a small flower in black enamel or onyx with a diamond quivering in the center. Ball ear rings appear in onyx and

jet goods, as does also bead bracelets and necklaces. The variety of designs and finish in Queen chains for mourning affords a wide field for selection.

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HEMATITE mounted in fine gold settings has come to be recognized as a standard article in second mourning jewelry, and jewelry for middle-aged and elderly persons. It affords, at a moderate cost, a refined and genteel ornament, and is kept in stock by all jewelers just as is onyx goods.

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GRAPE stone jewelry, THE CIRCULAR'S readers need hardly be told, has made for itself a popular patronage that extends from Maine to Texas. It is out this fall in all the new designs found in other classes of jewelry. For the benefit of retail dealers and their patrons, the manufacturers have issued a little manual giving not only illustrations of the new productions in grape stone, but fashions in mourning etiquette as well.

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SILVER jewelry is being manufactured in more elaborate designs than ever and is not unfrequently set with gems. The enamel work on the best class of silver jewelry is good as that which occurs on gold. Among ornaments that are in the height of favor just now are silver bead bracelets and necklaces, the latter being worn in several strands quite tight around the neck of the bodice. Silver lace, flower and corsage pins are all in demand for day wear, as are also silver sleeve buttons and enameled silver studs.

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THE skein dhu pins set with Scotch pebbles and topazes, and borrowing for their models Scotch daggers and dirks, previously described in detail, promise to continue popular during the fall and winter season. Their decorative appearance, together with their usefulness, recommend them far and wide.

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IN NOTING the improvements that mark the progress of the jewelry and silversmiths' trade, it is only fair to remark that there is much to commend in the cheaper grades of goods, not only as regards durability and workmanship, but design and finish. Most of the popular patterns introduced in all gold and sterling silver are reproduced in rolled gold and silver plate. This is done by reputable manufacturers in such a manner as to benefit an extended and respectable patronage without bringing discredit to the trade. It is also attempted by less honest makers in a way that brings opprobrium on themselves, in addition to hurting the trade of reputable people.

ELSIE BEE.

Practical Hints About Vision.

[BY C. A. BUCKLIN, A.M., M. D., NEW YORK.]



R. "T." PRESENTS the following description of his peculiar vision :

When I was a boy I used occasionally to get a book, but being unable to read well myself, I would get my father to read to me evenings. My means of getting an education were limited, and I was under the impression that all my difficulty in reading was owing to that fact, but I now think the trouble was with my eyes.

When I was about 19 or 20 years old (about 1836), I was standing with a sand-pot of hot resin, when it fell to the floor and the resin

flew up, struck me in the left eye, and as I instantly closed it, sealed it fast. I think it took my uncle about half an hour to pick it open with his pen-knife when he removed a shell like an egg shell, which covered the eye-ball completely and which was * * * *

I could not see anything at all with that eye for a week. I don't remember whether that eye used to pain me before that or not, but since that time it always has been more or less painful. I think it was about 1860-65 that I discovered that in passing along the streets at night, the gas-lights caused my eyes to ache very much—also the lights in a room, without a shade, would do the same thing.

About the year 1865 or '66 I began to see a beautiful worm about six or eight feet in front of my right eye. Both ends of it appeared to be the same with a gradual taper from the middle to the ends. It had beautiful spots, graduated according to their location on the body. There were many colors blended in each spot. The spots extended across the body. The thing was always in motion, slow and wavy, but sometimes when my eye is very tired it is in shape something like a knot or tuft. I can see it at almost any time in bright sunlight, and it is sometimes now within a few inches of my eye. I sometimes see dark spots before the other eye.

Print is very much mixed, and frequently I find the letters in a word transposed, and, therefore, call a word wrong. By looking at print with one eye, the letters are not so much mixed, but vision is somewhat weakened. Objects appear much lighter before the left eye than they do before the right one. I think there is a difference in my eyes in regard to focal distances.

Upon carefully examining Mr. T.'s eyes, I find that the case has unusual peculiarities. He was born far-sighted about $\frac{1}{2}$, which would make distinct vision for near objects difficult, but would in no way account for the peculiar phenomena he complains of. Careful examination of the cornea shows that the eyes were not injured by the hot resin. Examination of the lens shows decided opacities of the lens substance, and also oblique light, when it falls upon the lens capsule in just the correct direction, shows it to have a dark, hazy, general opacity, such as is frequently seen following severe intra-ocular inflammation. The spots seen by him are partially in the eye and partially in the substance of the lens.

He never could find his place promptly in attempting to read, neither could he be certain of keeping it.

The eyes were evidently imperfectly developed, or he suffered very early in life from an attack of choroidites. In simple far-sight the difficulties arising from the visual defect would disappear entirely when this was corrected with lenses. In the above case, however, the difficulty of finding the place promptly still continued, although the vision was wonderfully improved by the use of convex lenses.

I have a customer for glasses. He has trouble to read in the evening. I sent him to an oculist, who prescribes :

For reading.—Right eye +24. Left eye +48.

For distance.—Right eye -60. Left eye -36.

The man is not 40, and is perfectly healthy. Is this a case of asthenopia, resulting from the great difference in his eyes? C.

It is not usual for individuals of this age who require concave lenses for the distance to require convex lenses for reading. The difficulty may arise from the health of the patient being reduced from some unknown cause. It is possible that with a little rest for his eyes, and encouragement, he would be able to get on without convex lenses for reading. There are, however, many causes which make the accommodation of the eyes for near objects impossible, even though the individual be under forty and near-sighted, as paresis of the accommodation, diseases of the lens, mild attack of acute glaucoma diphtheria, and spasm of the accommodation, described in "*The Detection and Correction of Visual Imperfection*" as "false near-sightedness."

It is barely possible that your solution is the correct one, in which case -90 placed before the left eye would make the eyes equal, and still leave each eye with a degree of near-sight equal to $\frac{1}{60}$, which is

the same thing as giving a man under forty +60 lenses. Experience also teaches that occasional cases from unusual causes require stronger convex lenses for reading, even at this age.

The practical determination by experiment as to the lenses more comfortable for the individual in the above case is the best way out of the difficulty.

I think an article on extreme myopia would be interesting for the readers of THE JEWELERS' CIRCULAR. At least it has been my experience that they are very difficult cases. I had four different parties who used glasses, stronger than No. 5 during the past month, and all four were not satisfied with the glasses they were using; they wanted something better. I showed them No. 4½, 4, 3½ and 3, but they were not suited.

I suspect they were astigmatic. Now, my apparatus does not contain a glass stronger than 5, and most of these cases cannot see ten feet with their glasses on, so I don't see how to manage. Can you correct astigmatism at short range? W. W. EINHAUS.

Extreme degrees of myopia are the most difficult cases we meet with. One cannot be given glasses which are entirely satisfactory. The vision in such eyes is also very imperfect, independent of the optical defect. The eye becomes extremely myopic by being stretched, and the retinal elements during this stretching process usually become sufficiently damaged to prevent the attainment of a high degree of visual acuteness. Occasionally the stretching takes place in a lateral zone of the globe, thus allowing its elongation without injuring the retinal elements concerned. This mode of elongation is, however, unusual, the stretching process usually taking place in the posterior pole of the globe, thus doing great damage to the parts of the retina involved in curing.

It is an occasional occurrence of a life time that one is enabled to correct degrees of myopia above ½ with satisfaction to the individual or himself.

The experience of Mr. Einhaus does not differ from mine; neither can I do any better with this class of cases. What can not be done no one can do.

When you go into strong concave glasses there are two other difficulties constantly presenting, namely: the reduced size of the objects; secondly, the constant disturbed relations which the strong concave lenses produce between the accommodation and our ability to fix both eyes on a given object, thus for a given amount of accommodation we are taught by our senses to use a given degree of fixation.

Now, if the degree of accommodation is greatly disturbed by the use of a very strong concave lens, we very naturally fall into difficulty in trying to produce a degree of convergence which does not correspond with the amount of accommodation, the result is the glasses produce an unpleasant swaying sensation and objects look too small.

Extreme myopia must be looked upon as a disease which, with its development, causes vision to deteriorate from pathological causes.

Hyperopia on the other hand, only injures vision by occasionally causing the individual to become cross-eyed. In high degrees of hyperopia the eye is imperfectly developed, and the acuteness of distant vision is usually much below the normal standard, consequently when you use lenses higher than number five, either concave or convex, you will, as a rule, meet complications.

Theoretically *hyperopia* should give a decrease in the acuteness of distant vision, from no other cause than the optical peculiarities of the refractive error.

Myopia should theoretically give an increase of visual acuteness from no other cause than the peculiarity of the optical conditions present.

The following table gives the theoretical value of different degrees of hyperopia and myopia as it affects the *length of the eye*, *size of the retinal image*, and acuteness of vision:

| Degree of Hyperopia. | Length of the Eye in Millimeters. | Size of Retinal Image. | Acuteness of Vision Expressed According to Snellen's Method. |
|----------------------|-----------------------------------|------------------------|--|
| 1/3 | 17.4 | 0.85 | 17—20 |
| 1/4 | 17.66 | 0.88 | 17.6—20 |
| 1/5 | 18.07 | 0.90 | 18—20 |
| 1/6 | 18.36 | 0.92 | 18.4—20 |
| 1/7 | 18.57 | 0.93 | 18.6—20 |
| 1/8 | 18.73 | 0.94 | 18.8—20 |
| 1/10 | 18.95 | 0.95 | 19—20 |
| 1/15 | 19.30 | 0.97 | 19.4—20 |
| 1/20 | 19.64 | 0.98 | 19.6—20 |
| 1/30 | 19.82 | 0.99 | 19.8—20 |

It will be seen by the above table, that in no case of hyperopia is the theoretical acuteness of distant vision equal to that of the normal eye. By the following table it will be shown that theoretically the acuteness of vision of the normal eye is less than that of the myopic eye:

| Degree of Myopia. | Length of the Eye in Millimeters. | Size of Retinal Image. | Acuteness of Vision Expressed According to Snellen's Method. |
|-------------------|-----------------------------------|------------------------|--|
| 1/3 | 24.89 | 1.26 | 25.2—20 |
| 1/4 | 23.31 | 1.17 | 23.4—20 |
| 1/5 | 22.60 | 1.13 | 22.6—20 |
| 1/6 | 22.10 | 1.11 | 22.2—20 |
| 1/7 | 21.77 | 1.09 | 21.8—20 |
| 1/8 | 21.53 | 1.08 | 21.6—20 |
| 1/10 | 21.20 | 1.06 | 21.2—20 |
| 1/15 | 20.78 | 1.04 | 20.8—20 |
| 1/20 | 20.38 | 1.02 | 20.4—20 |
| 1/30 | 20.19 | 1.01 | 20.2—20 |

The measurements given in the above two tables were taken from a reduced eye made of glass and water. The measurements show very accurately the comparative length of the eye for various degrees of refraction. The size of the retinal image and the theoretical acuteness it should give.

The location of the nodal points have been neglected, as it takes us into impracticable scientific detail.

Gossip of the Month.

WE HAVE had much to say at various times in regard to retail dealers diversifying their stocks for the purpose of meeting the competition that comes from the outside, and now that trade has once more become active, we would again urge the subject upon the attention of dealers. The public will purchase with the greatest amount of liberality from those merchants who have the greatest variety and the best selected stock. This is where the bazaar men have scored their success; they find out what the public wants and then supply them with it, so that one can find in their establishments almost everything that is desired. Retail jewelers should make their establishments the most attractive business houses in their localities, keeping not only full lines of jewelry, but all goods that are of kin to it or attractive and salable. They need not fear that they are going to injure their legitimate trade by so doing, for experience shows that the reverse is true. An attractive store brings customers, and customers buy what they want, be it jewelry or other goods. Especially at the holiday season should dealers improve every opportunity to attract visitors to their stores, and in these days of novelties many are offered to them at low figures, which will help wonderfully in brightening up their stock and enticing purchasers to give them a call. In fancy glassware, crockery, porcelains, majolica and kindred goods there are to be found many things that are desirable for jew-

elers to handle, and the same is true of stationery. In both these lines the manufacturers are displaying great ingenuity in getting up new and attractive goods, and there is no reason why they should not be kept in stock by retail jewelers. Every thing of this kind helps to draw custom, and when intending purchasers are once in the store they are more apt to find some article of jewelry that they want than they will be if they stay outside. Whatever is new, novel and enticing should be made use of as an advertisement and also for possible profit. If dealers will thus diversify their stocks they will have less cause of complaint regarding the competition from outsiders.

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THERE is scarcely anything that more clearly shows the fickleness of fashion than the almost total disappearance of the cameo from articles of jewelry. It is but a few years since they were generally worn in sets, pins, etc., while at the present time they are scarcely to be found in the market. This is to be regretted, for in the manufacture of cameos there was given a wide range to artistic fancy, and many very beautiful and elaborate works of art came from the hands of the cameo cutters. Some of these have been carefully preserved by collectors, or are to be found among the choice treasures of art galleries, but they have disappeared from general use and are no longer worn, where once they were so fashionable that no lady could be entirely happy without a cameo set. The suddenness with which Dame Fashion turned her back upon cameos was such that many manufacturers found themselves with a large stock on hand which they could scarcely give away. One manufacturer told us that when the fashion went out he had a large stock on hand, and was glad to dispose of all that were mounted for the price of the gold used in their settings. We are inclined to think that the sudden downfall of cameos was due to the fact that a great many persons took to the idea of having their portraits cut in cameos, and when the butcher, the baker and the candlestickmaker, who had secured a little money, took to cameo portraits the lovers of art at once dropped them. There is nothing that so quickly kills a fashion as making it common.

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FOR some time past Maiden Lane has been almost blockaded by the light wagons of the various express companies that are so extensively employed by the jewelers when trade is good. No better evidence than this is required to demonstrate that the jewelry trade is at present enjoying a season of activity that has been unusual during the past few years. The statements of manufacturers and jobbers confirm this testimony to the fullest extent, the majority of them asserting that they have not been so busy in years before. One of them said to us: "This is the kind of trade I like; there is no boom and no nonsense about it, but just a steady demand that keeps us busy making goods and filling orders without pushing us beyond our capacity. Such a demand is evidence of a healthy condition of affairs throughout the country. Our orders come from no particular section but from all sections, thus showing that the increased good feeling is universal. The retail dealers are feeling the effects of the general prosperity yet are moving cautiously, buying only such goods as they have a call for, but duplicating their orders with much frequency. They are in excellent condition for a lively trade, for they are nearly depleted of goods owing to the dullness of trade in the past, and they are also more nearly out of debt than they have been in a long time, and so are ready to order liberally as circumstances warrant. I look for a good trade from now until the holiday season is over. Competition is very great, however, so that there is but little profit in the goods and we must sell all the more to maintain ourselves, and it looks as though we were going to be able to do it. The goods I make are a specialty, and when they sell readily you may be sure that the rest of the trade is doing a good business."

WHERE is the sense, we would like to know, in selling goods at prices that scarcely pay for the labor and materials entering into their construction? If competition is allowed to destroy profits how are the manufacturers and jobbers going to make a living? They have been waiting a long time for a busy season and an active demand for their goods, and now that it has come they ought to make the most of it, and get back some of the money they have paid out while waiting. They are entitled to a fair margin of profit and it is their own fault if they do not get it. Money is plentiful in the country, and the masses that have it to spend are willing that every man with whom they have dealings should make a fair living profit on his sales. It is a mistaken policy on the part of manufacturers to keep constantly striving to cheapen their goods, and also on the part of the jobbers and retail dealers to consent to dispense with their profits. If they are here to do business for love then it is all right, but if they expect to discharge their full duty to the community in which they live, they will insist upon having just and fair compensation for their services, for the use of their capital and for the risks they take. If the jewelry trade in all its branches would but insist upon having a legitimate and reasonable profit upon every transaction, there would be fewer failures and the loss to the community far less in consequence. All classes are better off and the country is better and richer when every man is receiving ample compensation for the services he renders, and for the capital and energy he puts into business enterprises.

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ATHLETIC sports have given quite an impetus to certain branches of the jewelry trade, for the many prizes given to successful competitors generally take on some form of work that comes from the hands of workers in gold and silver. Horse racing, yachting, baseball, bicycling, firemens' tournaments, and a great variety of other sports and trials of skill call for a great number of prizes, and a majority of these are furnished by the jewelry trade. Our attention was especially directed to this by a recent display of prizes that was made in a Broadway window that were intended for a grand athletic tournament, involving trials of skill in a great variety of ways, and seven out of every ten of the numerous prizes were articles either specially made by jewelers for the occasion or furnished from their stocks. The competition existing between the numerous sporting clubs makes it necessary for the managers to offer prizes of considerable value to secure the services of the various experts, cup-hunters and medal-gobblers. Many thousands of dollars are expended each season in this manner, and the jewelry trade has no reason to complain of the share that falls to its portion.

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AMONG the very first to tender pecuniary aid to the sufferers at Charleston by the recent earthquakes were the jewelers in different cities. As soon as the telegraph flashed the news to the country of the great destruction that had been wrought to the business interests of that city, proffers of assistance were at once sent back, and the business men and capitalists of the North expressed their willingness to aid their Southern brethren in the work of alleviating distress and providing for those who were left destitute and homeless by the disaster. The jewelry trade has ever been prompt and liberal in responding to the call of distress, as many sufferers by fire and flood can testify, and they were equally prompt to tender their sympathy and substantial aid when the wonderful commotions of nature inflicted such disaster upon Charleston.

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THE importation of diamonds for the trade this season is said to exceed the importations of any previous year by a very large amount. Americans have become known throughout the world as the largest

consumers of diamonds and other precious stones, and, as a consequence, the choicest are saved for American buyers. These report that they were able to secure a very large and desirable assortment of rare and beautiful gems, and that intending purchasers will probably never have so good an opportunity of providing themselves with what they want as is now offered to them. Foreign workmen, however, cannot teach ours anything about setting gems in an attractive form, for that work can be done here better than abroad. Nearly all the precious stones brought to this country are unset, the purchasers being allowed to designate their preferences in this respect. Many, of course, are mounted for the trade, and these show a degree of artistic taste in the settings that is not found in gems mounted abroad. European tourists who have undertaken to buy set diamonds in Europe concede the superiority of the American styles of settings, and not unfrequently have their foreign bought stones reset on arriving home. Indeed, our tourists have learned that there is nothing to be gained by purchasing jewelry abroad, for the workmanship put into it is not of a kind to satisfy the American taste in that respect.

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THE CIRCULAR has for some months been printing a series of articles under the heading "Advice to Watchmakers' Apprentices." They are plain, sensible articles, full of good, solid and practical instruction. We are only fearful that the class for which they are intended will soon become obsolete, in view of the position taken by the Knights of Labor and some trade societies regarding apprentices. Recently the journeymen plumbers of this city went on strike because their employers insisted upon arranging the matter of apprentices to suit themselves and the requirements of their business. In that and many other trades the journeymen have declared that but one apprentice should be allowed to four journeymen. How they expect competent workmen can be trained under this limitation it is impossible to conceive. But this is not the worst feature of the arbitrary rule of the workmen; by their own act they shut out from honorable occupations their own sons and are compelled to see them grow up in enforced idleness, frequently to become corner loafers, thieves and tramps. At the same time that employers are anxious to give employment to a reasonable number of boys, teaching them trades that will make them desirable members of society, the rule of the workmen prohibits them from doing so and drives the boys into criminal courses. What do the workmen think is to become of their boys? All the professions are overcrowded, and even if the parents were in condition to educate their boys for them, they would find it harder to make a living at the learned professions than at any legitimate trade, for the reason that there are ten professional men where one is a necessity. In the trades the reverse of this is true, for already the prohibitive policy pursued by the workmen has bred a scarcity of good mechanics, and of good trusty workmen in all the trades there is a crying need. The sons of mechanics, who should be reared to the trades followed by their fathers that they might be a help and comfort to them, are driven to picking up the odds and ends of precarious labor, or take to those shiftless ways that too often lead to the penitentiary. In nothing are the intelligent mechanics of this country so short-sighted as in their treatment of the apprentice question. Instead of making the learning of a trade a matter attended with great difficulty they should encourage the apprenticeship system, and insist that every boy who undertakes to learn a trade should have the opportunity to do so thoroughly, and that he should not be permitted to work as a journeyman until he had obtained a certificate that he had worked a specified number of years as an apprentice and was a competent workman. If, instead of striking for fewer hours of work and against honest workmen because they do not belong to some particular union, the workingmen would strike against incompetency in their own ranks and seek to elevate the standard of honest workmanship,

they would be rendering better service to themselves and the community in general.

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THE new silver certificates in denominations of one, two, five and ten dollars, are expected to be ready for issue by the Treasury department early this month. It is to be substantially a new paper currency, and the department is striving to make it the most attractive paper money ever issued. They are to be printed with the same colored inks as the greenbacks; the backs are to be beautifully engraved with original designs in lathe work which covers the entire surface of the bill, except an ellipsoid in the center in which are the words, in small but plain letters, "United States Silver Certificate." The vignette of the \$1 certificate has the portrait of Martha Washington, the \$2 certificate has the portrait of the late Gen. Hancock, and the new \$10 certificate has a well engraved portrait of late Vice-President Hendricks. They are to be printed on the fiber paper similar to the greenbacks. Already the demand for the lower denominations of these certificates is very great and comes from all sections of the country, showing that business men are ready to accept almost anything in lieu of the clumsy, awkward and debased silver dollars that have now come into such general use. It is to be hoped that before a great while the country will be relieved of all currency issued upon a silver basis.

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THE partial destruction of Charleston, S. C., by earthquake early last month and the loss of several lives, was an event that carried consternation into the hearts of many business people and excited the keenest sympathies of the entire community. The shocks of these earthquakes were felt very generally upon the Atlantic sea-coast, but in no place were they so pronounced or so disastrous as in the vicinity of Charleston. The destruction of property in that city is estimated at \$5,000,000, but it is not probable that the full extent of the damage has yet been ascertained, as many houses that are still standing are likely to be found untenable when heavy rains or storms come upon them. The first shock which visited Charleston was the heaviest and worked the greatest amount of damage, but at intervals during a period of a week these shocks were repeated every night at 11 o'clock until citizens of the place became thoroughly frightened and demoralized. This is not surprising, for there is nothing so well calculated to terrify a person as an earthquake shock; when the solid earth gapes and yawns, and heaves and trembles under his feet, his confidence in everything is destroyed. The fate impending is something that he can neither see nor provide against, and it is the uncertainty that upsets the nerves of the strongest and makes them quail in dreaded expectation of what may come. The fright of the negroes in Charleston would have been something extremely ludicrous had the circumstances and conditions not been so appalling, but as it was, the white people were quite as much frightened only they did not show it to such a degree. This terrible disaster, following so closely on the cyclone that visited Charleston a few months ago, destroying \$1,000,000 worth of property, is a serious blow to that enterprising city, and it was not surprising that for a long time they were glad to receive the sympathy and generous contributions poured in upon them from every section of the country. The wonder is that while so large a section felt the shocks of the earthquake Charleston was the only place of importance that was seriously damaged. Such a shock occurring in New York, Boston or Philadelphia would have inflicted damage that could only have been estimated by hundreds of millions of dollars; but these cities were providentially spared, although the commotion was plainly felt in nearly all of them. The disaster at Charleston will have scarcely any perceptible effect upon the business of the South and none upon the country in general. The tide of activity that set in

so flatteringly at the close of the summer still continues, the South seeming to enjoy its full share of it. In fact, instead of being a national calamity as might have been, the September earthquakes proved to be a local disturbance merely; one calling for our warmest sympathy but not affecting the welfare of the entire community.

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IN CONNECTION with the terrible destruction of property at Charleston by the earthquake, every class in the community was called upon to contribute to aid the sufferers. It was done promptly, eagerly, and liberally, the jewelry trade responding with its customary alacrity and generosity. Here was a community reduced in a moment from prosperity to absolute suffering and want, from causes which could not have been foreseen and against which no provision could have been made. It was one of the most terrible experiences that any citizens of this country have at any time been called to undergo. They had the right to expect the sympathy and substantial support of their fellow citizens, and it is a pleasure to know that it was given with alacrity. But this is one of the cases that should be provided for by the national government. We have heretofore suggested in these columns, in view of unforeseen disasters falling upon any portion of our citizens, that there should be provision made by the national government to meet the emergency. Congress should be induced to make an appropriation of, say, \$10,000,000 as an emergency fund to be used under the direction of the President and the heads of the departments for the alleviation of suffering falling upon communities, against which human wisdom can make no provision. By making such an appropriation, or creating such a fund, the relief required can be more quickly secured to the sufferers and the burden more equally distributed than it now is among the people in general. At present when a disaster of this kind occurs, an appeal is at once made to the wealthy and charitably disposed persons, whose liberal contributions have never been wanting, but upon whom those frequent drafts become burdensome. A national fund created from the public revenues would distribute the burden equally among all taxpayers, and the necessity for these appeals to the charitable would be done away with. With the creation of such a fund would naturally follow the accumulation of means for promptly relieving the suffering. For instance, the earthquake at Charleston so injured the houses that their owners were afraid to occupy them, and for many nights hundreds of families slept in the open air rather than run the risk of falling bricks and mortar within their tenements. Had there been a national relief fund, these sufferers could have been provided with abundance of tents in a very few hours, and thus many lives saved that were sacrificed in consequence of the unusual and prolonged exposure to the weather. The tax upon 60,000,000 of people required to create an emergency fund of this kind would be so very slight that it would not be felt, and the large contributions of individuals would become unnecessary, while the suffering to be relieved would be much more quickly met than it is now, when it is dependent upon voluntary contributions. Another point in this connection is worthy of note. While the desire to extend help in cases of disaster of this kind is common to all people, there is nearly always a delicacy among business men to take the initiative in starting subscriptions, for fear their neighbors will think they are doing so from selfish motives and have some axe to grind. We know this was so in the Charleston case, for when the disaster was reported members of the trade at once suggested that relief measures should be taken, but hesitated to move in the matter lest they should be accused of a desire to thus secure an advantage for themselves in order to control the Southern trade. These same persons, however, were among the most liberal contributors when they were approached by some one else. For this reason, when public subscriptions are necessary, they should originate, not with individuals engaged in business, but with Boards of Trade,

Chambers of Commerce, etc., that have no personal ends to serve, and consequently can not be suspected of any sinister motives in making a move in that direction.

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A RECENT consular report on the trade of Lowanda on the west coast of Africa, states that it is principally in the hands of the English, French, and Portuguese, the two first having the largest share. British manufactured goods are largely imported, not only direct from English ports, but also from Portuguese ports and in Portuguese vessels. The country is said to be rich in minerals, and well watered in comparison with many districts along the coast. The region is being settled rapidly, and will undoubtedly at a very early day form quite extensive markets for American as well as foreign products. The question is shall our merchants compete for the trade.

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WHILE everybody is sympathizing with the sufferers at Charleston, they should not forget that another Southern State has been greatly afflicted. The recent storms on the Gulf of Mexico worked great disaster to nearly every town on the Texas coast. A summary of the losses that have occurred shows that 38 lives were lost, the crops were injured to the extent of \$1,000,000, city and town property to the extent of \$3,500,000, and shipping and harbor improvements equal to very nearly another million dollars, making a total of some \$5,500,000, distributed over the seaboard of a State whose people in the aggregate can ill afford to lose their property by sections. These losses are a serious set back to the business in that part of the country at a time when trade was beginning to show unmistakable signs of improvement. The aggregate losses by this disaster were equal to those at Charleston, but being more scattered and not coming so suddenly and in such a startling manner, the sufferers were able to make better provision for themselves, and consequently no appeal for relief has come to us from Texas. Nevertheless the business men of the North should not forget in dealing with their Texas customers the fact of the disaster that wrought such destruction upon the coast.

The Action of Oil on Metals.



R. J. J. REDWOOD, of London, having made a number of lengthened experiments, principally with a view to determine the oils best adapted for mixing with mineral oils for lubricating purposes, has published the results obtained, a *résumé* of which will be useful to horologists, with whom the action of different oils on metals is a subject of paramount importance. The metals were first thoroughly cleaned, washed with ether and dried, and, after being weighed, placed in cork tubes together with 15 c.c. of the oil, the tubes being kept for twelve months at an average temperature of about 80° Fahrenheit in the summer, and at 50° to 55° Fahrenheit in the winter.

The results show that:—

Iron is least affected by seal oil and most by tallow oil.

Brass is not affected by rape oil, least by seal oil and most by olive oil.

Tin is not affected by rape oil, least by olive oil and most by cotton seed oil.

Lead is least affected by olive oil and most by whale oil; but whale, lard and sperm oils all act to very nearly the same extent on lead.

Zinc seems, by the four actual weighings that were of any value,

to be not acted on by mineral lubricating oils, least by lard oil and most by sperm oil.

Copper is not affected by mineral lubricating oil, least by sperm oil and most by tallow oil.

Mineral lubricating oil has no action on zinc and copper, acts least on brass and most on lead.

Olive oil acts least on tin and most on copper.

Rape oil has no action on brass and tin, acts least on iron and most on copper.

Tallow oil acts least on tin and most on copper.

Lard oil acts least on zinc and most on copper.

Cotton seed oil acts least on lead and most on tin.

Sperm oil acts least on brass and most on zinc.

Whale oil has no action on tin, acts least on brass and most on lead.

Seal oil acts least on brass and most on copper.

Mineral lubricating oil has, therefore, on the whole, the least action on the metals experimented with, and sperm oil the most. For lubricating the journals of heavy machinery, such as turret clocks, either rape or sperm oil is the best oil to use in admixture with mineral oil, as they have the least effect on brass and iron, which two metals generally constitute the bearing surfaces.

The Besancon School of Horology.



AMONG HOROLOGICAL SCHOOLS one of the most important is undoubtedly that of Besançon. It was founded in 1861, by the aid of the Municipality, which voted a sum of £1000 to start it in instruments, tools, benches, library, etc., and for the purpose of maintaining it they provided an annual income of £1000. This amount is raised by diverting a portion of the dues paid to the Hall for every watch case stamped.

Since its establishment the school has progressed with various fortunes, but on the whole very satisfactorily. Out of the above income the director receives £220, and various professors from £20, £32, £90, to £140 a year. General expenses are covered by £80.

Teaching at the school is gratuitous to the sons of parents residing in the town, but a charge of £8 per year is made on all foreign pupils. This fee—from a yearly average of 30 pupils from all parts of the world—brings an extra income of about £240, which must be added to the £1000 before mentioned. Foreign pupils are boarded and lodged at the Lyceum, where they receive, for 52s. a month, the same careful treatment and moral regulation as the regular students. Accommodation is provided at the school for 80 to 100 students; the present number is 60. The duration of studies is fixed at three years, but may vary according to the dispositions of pupils or circumstances. Besides the general object of becoming good watchmakers, students at Besançon have other immediate prospects. Being constantly brought in contact with the members of the visiting committee, themselves large manufacturers, they may get engaged, as soon as their time is over, as foreman or specialists, and as the school-teaching has lately been directed towards the study of electricity as applied to horology, etc., a certain number of situations are reserved every year in Government offices to those who show special aptitudes, at salaries beginning at £60, and ending at £140. These sums, in order to represent their true value to English people, must be about doubled.

Chronometer making is also receiving the attention of the Direction, and is expected to take some extension as soon as the organization of the Observatory shall have come to completeness; and thus another interesting and advantageous field will be opened. Great reliance is placed on the clever and energetic present director, M. Paul Chopard.

That the manufacturers of Besançon have been wise in their gene-

ration seems proved by the fact that the production of watches, which in 1860 numbered 211,811, reached in the year 1883, 501,602! and now occupies 191 licensed manufacturers and 15,000 workpeople.

English travelers, whose business knowledge of Switzerland has been hitherto limited to Le Locle, La Chaux de Fonds, and Bienne, might do well to take Besançon on their way, and to stop there a day or two. It is now, since the opening of the railway *via* Morteau, almost in a direct line, and is but at a distance of 276 miles from Paris. An express train takes the traveler there in nine hours. Besides the school and other watchmaking establishments, the town itself is well worth a visit.—*Horological Journal*.

Smuggling in Canada.



ACASE of much interest to retail jewelers in Canada came to our notice a few days ago. The regular jewelers of St. Marys, Ont., have for some time past complained of being undersold in the matter of watches and jewelry, by a shoemaker residing in the same town, and could not understand how it was done. They finally consulted with one of our leading jobbers about it, and the result was that the Customs authorities were informed of the facts and proceeded to work up the case. The latest case of underselling, it appears, was a gold watch which was purchased by a well known resident of the town. This the Customs officers seized, and the purchaser repudiating any fraud referred him to the shoemaker from whom he had purchased it. The shoemaker showed up an invoice from a Canadian jobbing house and thus cleared himself, and the officer then proceeded to investigate the record through the jobber's establishment. The jobber could show no Customs entry for it, and finally acknowledged that it had been smuggled, which result led to a seizure of his place and a thorough examination of his books. The final outcome of the case was the confiscation of the watch by the Customs authorities, and a fine upon the jobber who smuggled it. The case is of more than ordinary interest to retail jewelers throughout Canada, inasmuch as it shows that smuggled goods can be seized even after having been sold and in the possession of the purchaser. There is no doubt but that in some places a good deal of smuggling is done, much to the disadvantage of the honest dealer, but now that it has been shown that the Customs authorities are not disposed to let even small infringements pass with impunity, those who have been undersold by smuggled goods can see a remedy at once quick and effective. The above may be taken as a test case and it will be the jewelers' own fault if they find themselves as badly handicapped in the future by dishonest competitions. We have no sympathy with professional informers, but merchants who use such information as a protection to their own legitimate business are not only entitled to respect but commendation.—*The Trader*.

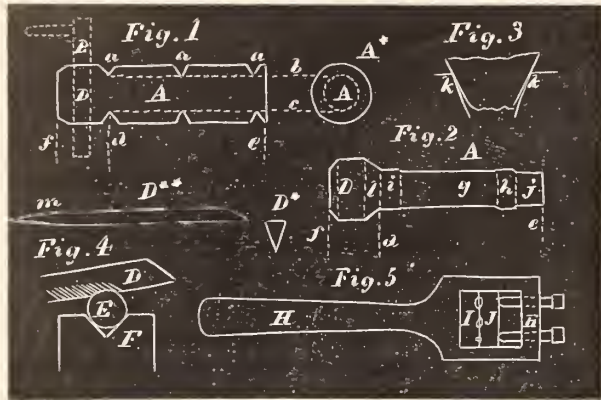
Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.



IF WE HAVE only an ordinary sized American lathe to work with we had better resort to filing to reduce the heavy parts of the chucks we are making. We put our drilled blank for a chuck into the lathe and turn in grooves as shown at *aaa*, fig. 1. These grooves should be nearly down to the size required, and after they are turned put the blank into your vise and file away on the line *b* until the grooves are near filed out on that side. At diagram *A** is shown a transverse section; the inner dotted circle represents the bottom of one of the grooves. We next file *A* flat opposite to *b* on the line *c*. Then file it (*A*) square, then 8 square, then as near

round as we can, not quite erasing the grooves $a a$. It is to be understood that the filing is to be done on the part between the dotted lines $d e$, leaving the part between the dotted lines $d f$ of full size to form the grasping part of the chuck we are making. In turning the grooves the dog for holding the work is supposed to be at the dotted outline shown at B . At fig. 2 is shown a chuck complete except splitting. Here (fig. 2) is shown the chuck divided up into parts by divisions made with dotted lines; the part at j is for the screw which meets and engages the drawing in spindle. The part at h is turned to exactly fit inner bore of the lathe spindle; so is the part at i . The part at g can be a trifle smaller than i or h . The part at b is the cone and should be turned to match the hollow cone of the lathe. The only places which require very exact turning is at h and i , as



will be readily understood; but all this can be done with a graver held in the hand, if the hand is a skillful one. The very particular part is at h . The part at i as soon as the cone retracts or contracts perhaps is the better term, of course does not exactly fit the bore of the hollow of the lathe arbor. In regard to turning the cone l if it exactly fitted the hollow cone in the arbor of the lathe when the drawing in spindle commenced to act, it would, of course, only touch at the outer edge. Consequently in turning our chuck if we turn the cone l so it touches firmly on the outer edge, we are probably pursuing about the right course. A hole drilled in a piece of thick ($\frac{1}{8}$) steel and broached out to exactly the size for the chuck at h , is a very convenient and about as good a gauge for size as we can use. Of course, in turning the cone at l we do not want to make the difference between the hollow cone of the lathe arbor and the chuck too pronounced. The cut at fig. 3 will give the idea, the male and female cones touching at k and come very near touching all the rest of the way down. Turning and fitting the screw at j is too common a job to need any remarks except to say, all screws as large as this should be cut with movable dies, *i. e.*, dies which close together with screws. Usually all persons buying an American lathe gets a screw plate for cutting the ends of brass chucks which are used as wax chucks, and this screw, as a rule, corresponds to the screw at j ; but even if it does it is better to have a plate with movable dies. If the reader has already such a die plate he can easily fit a new pair of dies, and copy from a tap made in the fixed plate which comes with the lathe, for it is much better even for the brass wax chucks to have a deeper thread than one can well cut with a fixed plate. Cut a thread on a bit of Stub's steel wire in your fixed plate with as full and good a thread as you can. Now for deepening the thread. If we could buy knife-edge files of the proper angle it would all be easy enough, but, unfortunately, we can't get them; but we can easily make one. At fig. 4 is shown the method of deepening the thread of a top, D representing the file, and E the screw, and F a filing block in a bench vise. The proper angle for such a file is shown at D^* , which is a transverse section of D enlarged. To make such a file we get out a piece of steel about $\frac{3}{16}$ wide and 3 inches long, with a tang at m for going into a handle. We cut this file into grave lines as shown, commencing to cut the lines near the back and coming out at the edge. The surface of D should be kept oiled when the graver cutting is done. The file D should be cut on both sides. In filing for deepening the thread, of course, the work is done unequally, but in

cutting a pair of dies with it, the reader will find it all right if the deepening has been anything like well done. In cutting movable dies the top does not want to be squared or deeply grooved, if graver lines are run across the thread parallel to the axis so as to cut the threads into fine teeth it will be found quite sufficient. Those persons who have not got a plate with movable dies can easily make a set at trifling cost of time and labor. At fig. 5 is shown such a plate the part H which forms the handle and frame for the dies ($I J$) can best be made of hard red brass, to be had of any brass foundry by furnishing a wood pattern. The length 4 inches; the dies $I J$ $\frac{3}{4}$ long, a plump $\frac{1}{8}$ thick and $\frac{5}{16}$ wide, and admit of 3 holes for different sized threads. In putting the blank shown at fig. 1 into the lathe for roughing out, the best way is to put the dog on as shown at B ; but for the final finish it is well to reverse the ends and put the dog on j after the screw is cut, and turn h and i and cone l , leaving the finishing of the end where the grasping part D comes for a final operation and turning out after the chuck is split. The reason for changing ends in turning is that the live center, *i. e.*, the center attached to the lathe spindle, does better in as large a hole like the one in the open end at j than the dead center of the tail stock, as there is less wear. And, by the way, the dead center in the tail stock for such work should be polished to ensure as little wear as possible. After the chuck is fitted at h , i and l and the screw at j cut, it should be put in the lathe spindle where it is to run, and the small hole in the end at D just touched with the graver to perfect the cutting. But if the work has been well done it will hardly need it. We leave the end D larger and fuller than we intend it to be in the finished chuck until after it is split. The arrangement for splitting is simple enough and will be described in the next communication; but in the meantime we will consider the subject of split chucks as it will further our efforts in the future. The spindle of a lathe using split chucks can not be too carefully made, using every precaution in turning and grinding both for the bearings on the outside of the arbor, and the inner tube which receives the part of the chuck at h and the hollow cone to receive l . Now, if we were using only solid chucks (not split) with perfectly fitting bearings at h , i and l , we might say we had very near an absolutely perfect lathe. The chucks could be taken out and put back, and practically keep in perfect centering. But the instant we split a chuck that extreme accuracy disappears; true, we can make very accurate and nice running chucks, but still they are precisely in that state that we could wish them better. And it is very doubtful with the writer if a hardened split chuck is as good, all things considered, as a soft one. I have no wish to get up a controversy with gentlemen making lathes; I only look from my standpoint, and I admit the advance toward perfection in split chuck lathes as something wonderful. And the facility with which they can be used for so many purposes make them an indispensable adjunct in any watch repairer's shop.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number Four.

Continued from page 259.

THE AMERICAN WALTHAM WATCH COMPANY.

Messrs. Tracy, Baker & Co., Appleton, Tracy & Co., Waltham Improvement Company, American Watch Company, and the American Waltham Watch Company.



THE BOSTON Watch Company, as previously stated, was obliged to succumb from force of circumstances, and the reader's attention is now to be directed to those who come into the arena to fill the place of those who went out. To a certain extent the old company had laid the foundation upon which the new were to build,

and the ability of the managers of the latter to grasp the situation in all its length, breadth and depth has since been abundantly proven.

After the assignment of the Boston Watch Company, Mr. Chas. E. Rice, the assignee, began, of course, to look for a purchaser for the Boston Watch Company's plant, and found one in the person of Mr. Royal E. Robbins, of the firm of Messrs. Robbins & Appleton, importers of watches in New York city. He, however, was not the sole purchaser. Messrs. Tracy & Baker, gold case manufacturers of Philadelphia, who had been furnishing the Boston Watch Company with gold cases for their movements, were creditors of the bankrupt firm to the amount of \$8,000, and came on to Waltham to look after their interests. They were told that they had better buy the factory and run it, but this was a financial impossibility with them, so they arranged with Mr. Robbins to furnish the greater part of the capital to buy the plant. April 9th, 1857, the day of sale, arrived, and Mr. Robbins was duly on hand to bid on the property in the joint interest of himself and Messrs. Tracy & Baker. The real estate was first offered. It consisted of 61,000 feet of land, factory buildings, boarding house, grocery store, small cottage and several other minor buildings. The bidding was prompt and spirited, and it was knocked down to Mr. Robbins for \$8,500, subject to a mortgage of \$7,000.

Then the steam engine, machinery, tools and material in the factory were offered. The bidding was rapid, and Mr. Robbins was again the purchaser at \$35,000, also subject to a mortgage of \$6,000, making the cost to the firm \$56,500 for the entire plant.

The last named purchase, it was supposed, covered all the contents of the factory, but upon a closer inspection it was found that a considerable quantity of material and some of the tools had been removed, as the ownership of them was claimed under the trusteeship which preceded the failure. Mr. Edward Howard, who up to this time had been the head of the Boston Watch Company, now returned to Roxbury, where he established the firm of Messrs. E. Howard & Co., the history of which will be given in another part of this work. Within a few days after the sale the factory at Waltham was under way again with a force of some seventy-five operatives. Mr. A. L. Dennison was retained by the new management as superintendent, and Mr. N. P. Stratton, who had also been with the Boston Watch Company, was made assistant superintendent, with power to act as superintendent in Mr. Dennison's absence. The next day after the sale Mr. Dennison started for England for the purpose of obtaining the material which was required and also to arrange for the manufacture of dials there. The new firm of Tracy, Baker & Co. existed but a short time, neither Mr. Tracy nor Mr. Baker had any faith in the enterprise, and after two or three months they withdrew, selling their interest to Mr. Robbins, who immediately organized a new firm styled "Appleton, Tracy & Co." It was composed of Mr. James Appleton, Jr., a former resident of Buffalo and brother of Mr. Robbins' partner and Mr. Robbins himself. Mr. Tracy's name was temporarily used at his special desire, but he retained no real interest.

Mr. Appleton came to Waltham to reside and was nominally superintendent. The first production of the new firm appeared during the summer following. They were full jeweled and corresponded to the grade formerly marked "Boston Watch Company." They were the same in general construction and largely so in detail as those made by the latter company. New life had come into the factory with the new management, but a little time must necessarily elapse before it could be apparent in the production. Two cheaper grades were also made called respectively "R. E. Robbins" and "Chas. Parker," Mr. Parker being an employee in the machine shop at that time. Leaving the company's productions here, the reader's attention will now be turned in another direction for a short time. The early part of the disastrous panic which swept over the country in 1857 was spoken of in connection with the Boston Watch Company, but the business outlook was even more precarious as the fall drew on, and Mr. Robbins foresaw that expenses would need to be cur-

tailed at the factory. With this end in view he reduced the time of the employees in October to one-half with half pay and ran the factory in this way for a few weeks, when he decided that still another reduction must be made, so he called a meeting of the employees "one cold, stormy night in November," as he said in speaking of it afterward, and laid the matter before them. He told them if they would work three-quarter time for half pay he would endeavor to run the factory during the winter, otherwise he would be obliged to close up entirely. The proposition was accepted and the winter months passed away slowly without any interruption of any kind in the work. In the spring of 1858 Mr. Robbins began to entertain the idea of moving the factory from Waltham to Newark, N. J., or some other locality near New York city, but Mr. W. H. Keith, who was still the treasurer and business manager of the Waltham Improvement Company, thought if their charter for the manufacture of watches was at all valuable, and they claimed it was, the time had come to bring it into active service. So with this end in view he called on Mr. Robbins and made him a proposition that his firm should unite with the Improvement Company and thus make one strong company and increase the capital and facilities of both. Mr. Robbins went home to New York, and a few days later Mr. Keith wrote him a long letter, from which the former kindly permitted the following extract to be made: "Upon the topic you introduced at our first interview I have thought much, and believe I have looked at it from your standpoint instead of my own. The old company broke down and yours has sprung up from its ruin. Though quantities of goods have been manufactured, I have no doubt that nine-tenths of the people even in this State are altogether skeptical of its success. If it is so here, how much more would it be so in some other State." An extract was also allowed from Mr. Robbins' letter of May 4th, 1858, in reply to the above. "After several days' reflection upon your letter and your conversation with me, I will admit I have come to regard the project more favorably, if it can be accomplished on satisfactory terms. The advantages of increased capital and divided responsibility are obvious enough to me, even in the present condition of the business, and perhaps are equivalent to those advantages which we may give up. While forecasting the future of watch making, so far as I can, it is impossible not to see that it is wise to establish the concern on as broad a basis as with such an outlook it ought to occupy."

The Board of Directors of the Improvement Company held a meeting and a committee was appointed to confer with Mr. Robbins, and after several meetings they finally authorized, on June 14th, the purchase of the watch factory, and on June 28th voted to assess the stock of the Improvement Company \$1,000 per share to provide means for the purchase. This plan met with great opposition on the part of many of the stockholders. The company had already been obliged to take thirty-two shares of delinquent stock on which the former assessments had not been paid, and the unpaid notes of the Boston Watch Company were also soon coming due, and many felt that the company ought not to assume any new obligations. Mr. Keith saw all the stockholders and had their views. As a result, 25 of them refused to remain in the company, but agreed to relinquish their stock at prices ranging from \$300 to \$450 per share. The actual cost to them had been \$387.50. This, together with the thirty-two shares already held by the company, threw fifty-seven shares of the stock into their hands.

Buyers were soon found, however, for the greater part of it. Mr. Robbins took some, the directors increased their holdings, and other friends of the enterprise also came in. Having all details arranged the president took possession of the watch factory on behalf of the company and the firm of Messrs. Appleton, Tracy & Co. passed out of existence, although the name has been used ever since as a trade mark on the best grade of full plate movements which the company made until the advent of the new "Crescent Street." Mr. Keith was elected clerk of the company soon afterwards to fill the vacancy made by the resignation of the former clerk. Mr. Keith resigned

his position on September 29th, 1858, and Mr. Robbins was then elected treasurer and business manager of the Waltham Improvement Company in his stead, and subsequently of the American Watch Company. He still retains the office, and his name has become almost inseparable from the company. The great success they have attained financially under the policy which he has maintained is too well known to need comment.

Application to the Legislature was now made to have the charter amended and the name of the company changed to the American Watch Company. The act was approved February 4th, 1859, and at a meeting of the stockholders immediately after that name was assumed.

The charter allowed a capital of \$300,000 in 3,000 shares of \$100 each, but the directors voted to place it at \$200,000. It was soon, however, advanced to the full extent allowed.

The name "Waltham Improvement Company" now ceased. It was significant and well chosen for its early purpose, but its work was done. To the incorporators of this company, Edward Howard, William H. Keith, James Brown, and to Horatio Adams, Esq., its first president, also to the late Horatio Moore, the town of Waltham is greatly indebted for its present prosperity, and going perhaps a little further the writer would say that Mr. Dennison ought not to be forgotten, as he directed attention to this place as a location. The years 1859-60 were not distinguished by any great changes beyond that full time was made and paid for and the facilities for doing work somewhat increased.

Perhaps the event which marked the year 1859 more than anything else was the withdrawal late in that year of several of the foremen and prominent workmen to enter the employ of the Nashua Watch Company, of Nashua, N. H., which had just been organized at that place. This was done at the instance of Mr. N. P. Stratton and Mr. B. D. Bingham, the latter, though at that time employed in the finishing room at Waltham, had been previously a watchmaker and jeweler at Nashua. Among others from Waltham, besides those above mentioned, were Messrs. Charles S. Moseley, James H. Gerry and Charles V. Woerd. The Nashua Watch Company, it may be said, was the American Watch Company's first-born, although, in after years, it was to count its offspring in considerable numbers. In consequence of the loss of these men, who for the most part occupied prominent positions, some changes were necessary at the factory. Mr. Ambrose Webster, who had formerly been foreman of the machine shop, was now made mechanical superintendent, and Mr. Albert T. Bacon was taken from the springing room and was made assistant superintendent of manufacture in place of Mr. Stratton. In the latter part of 1860 the war cloud began to rise, and business, which had not fully recovered from the panic of 1857, was totally stagnated. This seriously interfered with the operations of the company, which otherwise would have gone rapidly ahead on a prosperous career. Mr. Robbins now advised that a conservative policy be again adopted, and accordingly he called a meeting of the operatives, and, having explained to them that it was necessary, told them that he must shorten their time and lessen their wages. This arrangement was accepted without demur. At this stage it is due to Mr. Robbins to say that while he advocated the reduction of the wages of the employees of the company he also applied the same rule to himself. He reduced his own salary one-half, and requested the other officers of the company to make such reduction in their salaries as they felt they could do consistently. In February, 1861, Dr. Adams, the president, resigned, and his death occurred soon after. Dr. Mulliken, who had long been a member of the board, was elected to fill the vacancy. He was in turn succeeded by Messrs. W. H. Keith, F. M. Stone, the late Horatio Moore, and the present incumbent, Mr. E. C. Fitch. At the annual meeting in March, 1861, the report showed that 12,055 movements and 3,768 silver cases had been produced during the fiscal year, and over 10,000 movements had been sold, and although, in 1860, a dividend of 5 per cent. had been paid in, it was not deemed advisable to declare another until

the effect of the war cloud on business should be better known, as the company wished to carry on work if possible, even with largely decreased sales. Mr. Dennison, the superintendent, was somewhat impatient at the conservative policy adopted during this year, but as Mr. Robbins spent the latter part of the summer and fall of 1861 on a European wedding trip, of course no aggressive policy could be taken up during his absence; but the wisdom of this was afterwards fully demonstrated. Mr. Dennison severed his connection with the company late in December of that year, and was succeeded by Mr. A. T. Bacon as superintendent of manufacture and Mr. Ambrose Webster as master mechanic. Several changes and additions were made that year in the company's production. A lady's watch was gotten out and the names of several of the eighteen size grades were changed. The Appleton, Tracy & Co. remained the same, but the "R. E. Robbins" movement was now changed to "P. S. Bartlett," Mr. Bartlett being at the time an employee in the machine shop. Only about 200 of these movements were produced that year, but afterwards it proved to be the most successful selling full plate movement which the company made, and it has come to pass that the use of the name on the movement has made Mr. Bartlett's name a household word in the trade in this country. The name of John Watson, which had been put on the movement formerly called the Chas. Parker, was now dropped and the name of Wm. Ellery used instead. Mr. Ellery, who it will be remembered was one of the signers of the Declaration of Independence, but the name is not an uncommon one in these parts, for there is at present a resident of Waltham of that designation to whom the treasurer, on behalf of the company, presented a watch, the movement of which bears his own name. The eighteen size three-quarter plate "Wm. Ellery" movement was also commenced and a few were completed that year, but never met with a wide sale. Its maximum production was in 1863, when about 5,000 of them were turned out, but it was discontinued entirely in 1868, and no other 18 size three-quarter plate movement of a low grade has since been made by the company. The year 1861 was distinguished most perhaps by the production of a lady's "P. S. Bartlett" movement. There was a desire on the part of the management to push the production of this watch, which they believed would sell even in dull times.

There was no competition in the matter of the lady's American watch then, as none had ever been produced. The construction of the movement is familiar to many in the trade, especially the older members. It was 10 size, key wind. They were ready for the market in September, 1861, and the first one finished was presented to Mrs. N. P. Banks, wife of the famous General of that name, who still resides in Waltham.

The "Appleton, Tracy & Co." of the same size and style of the above was put on the market soon after the lady's Bartlett.

The production and sale of this movement was never as great as the former by one-half, being a much higher grade. Both of these were discontinued by the company some years after. The getting out of these new movements, however, did not make the year 1861 as prosperous a one as hoped for by the company. In addition to the reduction of salaries, a large number of the company's operatives were necessarily discharged in order to reduce expenses, many of them giving up their occupation of making watches to take up arms in defence of the Union; but although the times were precarious the company was on a sound financial basis, and, with Mr. Robbins at the helm, there was not the least danger of a collapse. It could not be called a prosperous year if viewed simply financially, but in other respects it was a red letter period, as it gave the company ample opportunity to bring out and perfect their new grades, in order to lay a foundation for the unprecedented prosperity incident to the latter years of the war. In 1862 the Nashua Company had absorbed all their capital, and, although nearly ready to put watches on the market, found themselves quite unable to go on. Accordingly Mr. N. P. Stratton waited on the American Watch Co. with a view to getting them to purchase the Nashua plant. The negotiations, which were

quickly and satisfactorily carried through, ended in April, 1862, in the complete absorption of the Nashua Company by the American Watch Co. Mr. Fogg was at once sent to Nashua to superintend the work there until another addition could be built to the factory at Waltham for the reception of the Nashua plant.

The movements which they made were three quarter plate, 16 and 20 size, key wind, gilt, of a fine grade, with expansion balance and exposed pallets. They were the first to make pallets of this style in this country. After the removal to Waltham, the part of the building in which this watch was made was known for many years as the Nashua department, and it was not until Mr. Woerd was appointed superintendent in 1876 that the whole factory was under one superintendent. Mr. Fogg continued to be superintendent of manufacture in the Nashua department after its removal to Waltham, and Mr. C. V. Woerd its mechanical superintendent until the date above mentioned. The acquisition of this plant proved a very successful venture for the American Watch Company, as they were now able to produce watches of fine grades, at least for that time, and their facilities for selling goods were such that they could now successfully compete with the finest Swiss and English watches that were imported, and were thus able to establish a reputation for the production of watches of superior as well as medium and low grades.

The company now entered upon a period of great financial prosperity incident to the war which began to affect business favorably in 1862. No innovations of any great extent were made, however, for some years after, or until 1866, except some changes in the Nashua department. The business of the company, it may be said, was to make money, and they did it faster than any watch company has ever been able to do it before or since. They had but little competition, the Howard Company being the only other American company then in existence, and the war of the Rebellion had created an unprecedented demand for American watches.

The great prosperity of the company during these years was, however, an incentive which brought several other companies into the arena. Large dividends were paid every year from 1862. In 1866 a cash dividend of 150 per cent. was declared, accompanied by a subscription of new stock. This raised the capital from \$300,000 to \$750,000 with a charter, allowing a capital of \$800,000. The company now began to branch out in many directions and occupy ground which they had not before felt justified in doing. The growth was a steady and healthy one, and in 1872 another increase was made to the capital, which was then placed at \$1,500,000, where it remained until 1885, when the authorized capital was made by Act of Legislature \$4,000,000 and the actual subscribed capital \$2,000,000, and the name changed to "The American Waltham Watch Company."

(*To be Continued.*)

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

THE EARLY MAKERS OF AMERICAN CLOCKS.

To the Editor of the Jewelers' Circular:

All persons interested in the science of horology cannot but feel under obligation to Mr. Crossman for his interesting series of papers, now being printed in your columns, descriptive of the early efforts made in this country to manufacture watches by machinery, and the excellent biographical notices he gives of those enterprising men. But the making of watches by machinery was the natural outgrowth of the manufacture of clocks in the same manner, and some one ought to give a succinct history of the early efforts of the enterprising men who established that industry in this country. Those pioneers struggled with adversity and poverty with zeal and pertinacity unre-

cedented, and made it possible for their successors to surpass all competitors in the production of clocks. While American manufacturers can make clocks now cheaper than any other makers, owing to the perfect machinery they have devised, they have not lost sight of the better classes of work, as the great number of superior clocks in the market testifies. But whatever the manufacturers of to-day are achieving was made possible to them by the persistency and sacrifices of their predecessors. I hope some one competent to do so will give your readers the early history of clockmaking in this country.

HOROLOGIST.

New York, Sept. 12.

CATALOGUES A NECESSITY.

To the Editor of the Jewelers' Circular:

I am one of those retail dealers who looks upon the issuing of catalogues by manufacturers and jobbers as not only a great promoter of trade but a matter of necessity. I have received a number this season, unaccompanied by price lists, and I am pleased to acknowledge my indebtedness to those who have had the enterprise to issue them. Some of them are elaborate and elegant and must have cost large sums of money, which, of course, those who issue them expect to get back from their customers in the way of an extra charge for their goods. I am glad to be able to contribute my mite to that end, and therefore make it a point to buy as much as possible from those firms that furnish me so much desirable information by means of their catalogues. I cannot see where the harm comes in to the retail dealer, even if a few outsiders do get hold of these catalogues, so long as there are no price lists with them; so far from being an injury, I think the general circulation of them would be a benefit to the trade, as many persons would be tempted to buy of the retail dealers the goods they see so nicely illustrated. If I could transfer many of the illustrations to the columns of our local papers I am sure they would prove the most attractive advertisement I could have. Instead of condemning the issuing of catalogues, I think those who do it are to be commended.

RETAIL DEALER.

Michigan, Sept. 15.

GOODS ON MEMORANDUM.

To the Editor of the Jewelers' Circular:

I see by your columns that jobbers and manufacturers are complaining about retail dealers requiring so many goods on memorandum. I do not see why they should complain in public of a practice that in private they seek to encourage. Of the many circulars and advertisements that I receive soliciting my patronage, a large proportion of them contain the announcement, "goods sent on memorandum when requested." Why, then, are the dealers to be blamed if they accept an invitation that is so persistently forced upon them? This is simply one of the many means adopted by manufacturers and jobbers to catch custom; it is a device of their own introduction and is held out as a special inducement to buyers. In almost every line of mercantile business samples are sent out by those introducing new styles to persons who are liable to become buyers, and the sending of goods on memorandum in the jewelry trade is simply the equivalent of sending samples. We receive the memorandum goods, and if we can sell them we do so and pay for them, ordering more as we require them. It is not our fault if there is no demand for a particular style or lot of goods, and that in consequence we have to return them; we are not to blame if the times are dull or if the manufacturer fails to hit the public taste. It has become a custom in the trade to send goods on memorandum—a custom introduced, fostered and encouraged by the very men who complain that it has grown to be burdensome. It does not strike me that they are entitled to any great amount of sympathy at our hands. If they do not desire to send out goods in that manner let them say so, and we will order and pay for such goods as we want; but so long as they continue to

invite me to send for goods on memorandum I shall probably continue to do so.

J. M. G.

Buffalo, N. Y., Sept. 20.

ARTIFICIAL DIAMONDS.

To the Editor of the Jewelers' Circular:

I was very glad to notice in your last issue the article by Mr. Kunz and also your editorial remarks in regard to the recent story circulated about the manufacture of artificial diamonds. I saw this story in print in the local papers and many persons have asked me about it. While I knew it was impossible to manufacture a genuine diamond, yet so many persons asked me about it and seemed to question my statement, that it was a relief to me to be sustained in my position by such authorities. I find that a great many persons actually believed that diamonds, and, indeed, pearls and other precious stones, can be made artificially, and I am even asked the question if the stones I am offering for sale are genuine or manufactured. There is an idea among the people that there are a great many bogus gems offered for sale, and while we do not expect the ordinary purchaser to be an expert in these matters, we ought to expect better things of our editors than that they would give currency to the statement that any of these can be produced by artificial means. Paste diamonds and bogus gems, of course, are well known, and everybody knows that such exist, but the confusion seems to arise in the minds of many as to whether or not a genuine diamond or other precious stone has been made by manufactured process or machinery. The oftener the fact can be reiterated and forced upon the people that there can be no artificial diamonds made, the better it will be for the trade, for while we can easily compete with paste jewelry, we cannot so easily dissipate the idea regarding artificially produced gems. I took a portion of Mr. Kunz's article and had it reproduced here in the same paper that printed the story about artificial production of diamonds and rubies. I think if other dealers would do the same thing it might have a good influence upon the public.

DEALER.

Chicago, Sept. 19.

THE QUESTION OF QUALITY.

To the Editor of the Jewelers' Circular:

I read with much interest the articles in your columns relative to the deterioration of quality in the manufacture of gold goods. It is with deep regret that I have noticed the tendency of manufacturers to degrade the quality of their goods, and I am confident that to this, more than any other one cause, is to be attributed the disappearance of jewelry to so great an extent from the realms of fashion. The manufacture of cheap goods have become so common that every servant girl in the land can appear as fine as her mistress, and while her mistress' jewelry may be worth large sums because of its intrinsic value, the servant makes just as good a show on a very small amount of outlay. Fashion is a fickle dame and it will not be trifled with; milliners, dry goods merchants and those who cater to the tastes and fancies of women, especially find this to be the case. When goods become cheap they pass out of style immediately; fashion no longer recognizes them and they are put upon the shelf to be sold at a sacrifice. The unbusinesslike competition that has existed for so many years in the jewelry trade has not only induced manufacturers of reputation to make cheap goods, but has also induced a lot of shysters to embark in the business of making sham goods, or goods into the production of which little or no gold at all enters and with which the market has been flooded. All this has tended to destroy confidence in the products of American gold and silversmiths. Those who could afford to wear fine jewelry have been afraid to buy, and so money they had to invest in that direction has largely gone to purchase precious stones. You have frequently noted the fact that the trade in diamonds, pearls, rubies and precious stones was continually on the increase, and also that America had become known the world over as the largest consumer of these. I attribute this to

the fact that manufacturers have virtually destroyed the trade in fine gold jewelry. While manufacturers of Europe may not equal their American brethren in style and workmanship, they do certainly excel them in the intrinsic value of the metal which goes to make up their goods. If you buy 14 karat goods from any house of ordinary standing, you will be very sure to get the quality that you pay for, while here you are never sure about it. As a consequence American tourists—each season sees thousands of them tramping over Europe—buy whatever gold goods they desire in that country, especially articles of personal adornment. These they can carry about their person and bring them into this country free of duty. I do not hold the manufacturers entirely responsible for this condition of things. Retail dealers have been constantly clamoring for cheap goods, and whenever an article of real value was offered to them they have demanded something cheaper that would look as well. They have tempted the manufacturers to degrade quality that cheapness might be acquired. While it is no doubt true that a larger quantity of cheap goods are now sold than was ever sold of fine goods, it is questionable in my mind if the trade at large makes as much profit upon the increased quantity sold as they formerly did upon a lesser amount. I have had a number of years' experience in the business, and am free to say that while I handle more goods to-day than I did ten years ago I have to work a great deal harder to get the same amount of profit. I believe that if we could return to our old standards we should be very much better off. There are manufacturers who still make genuine, honest gold goods, and we all know when we buy from them that the goods we obtain are precisely as represented, but the number of such houses is small indeed compared to the whole number in the trade. I wish there were many more of them whose trade mark would be a guarantee that the quality indicated by their stamp was the actual quality of the goods. I do not believe that the manufacturers who put a fictitious stamp upon their goods get very much of a profit by so doing. They do it to comply with the demand that comes to them from the retail dealers who want cheap goods bearing the stamp of quality with which to mislead the public. Neither do they make a large profit by such misrepresentation, for they get a small profit on their goods, be they genuine or imitation. The result of this is that the country is filled with 8 and 10 karat goods, or goods of a lesser degree of fineness stamped 14 karat, upon which the manufacturer, jobber and retail dealer has only made so much profit as could accrue to them from the actual quality of the goods. The public has not been swindled but it has been deceived. Now that the business is improving and there is a demand for gold goods, and that there seems to be an opportunity to make the wearing of fine jewelry more fashionable, it is to be hoped manufacturers will make an honest endeavor to get back to the higher standards of quality. I trust you will keep harping on this until something comes of it.

St. Louis, Sept. 22.

JOBBER.

WORKINGMEN AND TRADE CONDITIONS.

To the Editor of the Jewelers' Circular:

I am very glad to observe that you have given some attention to the labor troubles that have afflicted the country during the past year. As is well known, there are many manufacturing jewelers in Newark who give employment to a very large number of men. The troubles of the early spring gave them an intimation that they might anticipate a strike among their employees but it did not come at that time. Probably if business had been better we should have had the trouble that all lines of business did, but as the spring passed away without any demand being made by our workmen, it was generally thought best to conciliate them as far as possible by keeping as many employed during the dull summer months as we possibly could. As a fact, more men were employed during the past summer in the factories of Newark than has ever been known in several years before. The manufacturers did this at considerable cost to them-

selves, because they not only wished to serve the men by keeping them employed, but also to have them in case trade should become more active in the fall. By the middle of August the signs of activity became manifest and the factories became busy; more men were put on from time to time, until by the middle of September they were most of them running to their full capacity. Seeing this, these men who had been employed for months more as an act of charity than anything else, began to murmur and complain of low wages and to exhibit those signs of dissatisfaction shown in other lines of industry which resulted in serious strikes, which have been so much of an injury to industrial enterprises during the past few months. We hear that a strike is threatened and are fearful that it may come upon us at any moment. But the men employed in Newark should be given to understand that nothing that they could do would be more injurious to their own interests than what they threaten. Newark is an expensive city, in the first place, in which to manufacture goods; rents are extravagant and wages are higher there than in most other cities where the manufacturing of jewelry is a prominent industry.

It is with difficulty that the Newark manufacturers now compete with their rivals in business in the production of goods, because of the increased cost of production in Newark over other places. We are obliged to sell at a less margin of profit, and it is often difficult for us to get cost out of our goods. Our workmen do not seem to comprehend that there is any cost attaching to our products beyond that which is incurred in the factory itself. They forget that we must maintain our New York offices and keep numerous travelers upon the road at a heavy expense in order to dispose of the work of the hands. Unless we did this we should have no trade at all and consequently no work for our men to do. But these facts are lost sight of, and the men seem to think that whatever we get for our goods over and above what they cost at the factory is all clear profit to us, so they propose to ask an advance of wages, thus making the cost of production so much greater that we will have to abandon the field to our rivals or remove our factories from Newark. This latter alternative is the one that some manufacturers are now considering. We know that we can make goods in any other State cheaper than we can in Newark, but our plant is here, our workmen are residents here, and we would prefer to keep them, if we can do so, upon any reasonable terms, or terms that will allow us to make a living. How much of an advance the men are contemplating demanding we have not yet been informed, but we are told that they have their organization perfect, and that if a strike should come the employers are either to concede whatever may be demanded or stop business. I am convinced that under such conditions some of the factories will close down at once and others as soon as they can get such goods off as are already ordered. The workingmen who have made their homes here seem to forget that our factories are movable, and much more easily transplanted to any other spot than they can move their various families. Many of these men own their homes and if they were called upon to dispose of them now in order to secure employment elsewhere, they would unquestionably be forced to sell them at a sacrifice. These homes have been made from the wages paid to them by the manufacturers, often at times when the work given in return was not required. They have made a continuous profit out of us—for all over and above their living expenses is profit—while we have been losing money year in and year out. Now, at the very first signs of returning prosperity they threaten us with a strike, and a burden that is greater than we can bear. It would be well for them to consider carefully what they propose before they make any definite demands. The manufacturers are under no obligations to them whatever; on the contrary the boot is on the other leg. It would be neither prudent nor wise for the workmen to attempt to crowd the mourners too far at this time; at least give us a chance to make good the losses of previous years before asking us to increase your profits at the expense of our own.

Newark, Sept. 20.

MANUFACTURER.

Burmese Gold and Silver Workers.



THE BURMESE are adepts at artistic work in metal. Their gold work consists chiefly of female trinkets, the best being a kind of necklace called *bayet*, composed of several strings or chains of filigree work joined together, with little figures in red gold of the mythical *henza*, or sacred goose. The best silversmiths' work is seen in large bowls, embossed in high relief with fanciful designs. The plain cup or bowl having been shaped is filled with resinous composition, in the center of which is inserted a wooden pin, so that when the resin cools the cup is fixed as on a lathe, the pin forming a handle. The workman then with a graver and hammer slightly marks out the pattern, which he delineates by sinking the surrounding metal into the yielding matrix.

A little *niello* work is executed on the same principles as the lacquered boxes. The pattern is made in silver slightly embossed, and the whole is coated with black varnish or enamel. The lathe is used to take the varnish off the raised ground, leaving the silver pattern in a black setting.

The smelting of silver for producing the currency of the country is carried on in the following manner: Silver, purchased from the Kakhyens (who procure it from the Chinese), to the amount of six *ticals* (say $3\frac{1}{2}$ ozs.) is mixed with $1\frac{1}{2}$ *ticals* (378 grains) of copper wire, and the two metals are melted together, the smelter adding sufficient lead (judging the weight) to make up the total weight to ten *ticals* ($5\frac{1}{2}$ ozs.) The smelting is conducted in little saucers of sun-dried clay, placed on a bedding of paddy husk to make them lie evenly; charcoal is heaped up over them in hollow pyramids, which being ignited, the bellows are vigorously applied. As soon as the metals fuse, little pieces of lead are put in according to the judgment of the smelter. When the mass is at a red heat the charcoal is removed, and if a piece of wood, which is now held over the alloy, freely ignites, a round, flat, brick button about the size of a five shilling piece, on which a smooth layer of moist clay has been spread, is laid on the surface of the molten mass, two men previously blowing upon it through bamboo tubes. The brick disc does not cover the whole of the alloy, and the surplus metal round the edge forms a thick ring, to which lead is freely added to bring the mass up to the proper size and weight. As it solidifies, there forms a white disc of silver surrounded by a thick dark brownish ring, containing metal of the same purity as the disc but covered with a coating of refuse and lead. The mass is removed from the saucer before it is perfectly hard and the brick disc falls off, leaving the coating of moist clay adhering to the silver, which is then cleaned, and a number of round spots are dotted with cutch on the face of the alloy to make the mass look pretty. It is then weighed and is ready for cutting up. The saucers in which the alloy is melted are sold at 80 rupees (£8) per 1,000 to the lead smelters, who extract any silver and lead that may remain; and the refuse of this smelting is sold to the potters who use it as a glaze for tiles, while it appears to be sometimes also employed in *niello* work.—*Journal of the Society of Arts.*

Repairing Swiss Watches.



THE CUTTING of hollows in pinion faces and rivets, says H. Ganney, is, perhaps, the finest test of skill with the graver, as a sharp, well pointed, yet strong graver must be used, and the graver cutting clean, without root or roughness, leaving the hollow a bright gray. It was the practice years ago to polish hollows, but there is no skill in the operation and it has gone out of fashion. An ordinary facing tool was simply turned and filed small to fit the hollow, and the hollow received its form from the tool. The value of hollows to rivets and pinions, when the pivots are close to them, is very great,

as they prevent the oil running away from the pivots and shoulders. Should an escape wheel and pinion be lost they can be replaced by sectoring the fourth wheel for the size of the pinion, or a pinion whose leaves are rather smaller than the same number of teeth of the wheel may be tried in the depthing tool, taking the depth from the fourth and scape holes. The scape wheel corresponds in number on the gauge with the hole in the cylinder gauge in which it fits; but, before using, it will be as well to see if the cylinder passes freely between two teeth of the wheel, and that one tooth of the wheel has shake sufficient for freedom in the inside of the cylinder. This may be done by holding them in the fingers or by putting them in the depthing tool at the the correct depthing.

The height of the wheel or its suitability may be seen by turning or filing a small piece of brass like a ferrule and laying it in the sink of the scape wheel. By placing the wheel in this and putting the cylinder in place in the watch, the brass collet must be thinned until the wheel acts correctly in the cylinder, the bottom of which must be free of the wheel, and the tooth acting safely on the cylinder edges, by gauging the thickness of the piece of brass and bottom jewel hole in the Douzière gauge, and then deducting the thickness of the hole itself we obtain the right height for turning the pinion from the bottom shoulder to the seat for the wheel, and by putting the scape cock on and placing another piece of brass between the top jewel and the bottom and gauging the distance, we obtain the distance at which the top pivot and shoulder must be, rather low than high, as the scape cock readily lowers, but if raised, it might foul the balance.

A very troublesome fault in some of the best class of Swiss watches is too great a vibration, causing the balance to strike the bankings. It is most often found in watches having wheel teeth with straight inclines. The more modern practice is to curve the acting face of the teeth, and a slight alteration of the tooth diminishing the incline at the heel of the tooth will always diminish the amount of vibration. A new hair spring will sometimes cause the banking error. There is a tendency of late years to put too many turns in the balance springs of horizontal watches. A large number of turns in a lever balance spring is a great advantage, owing to the greater vibration necessary and desirable; but when the arc of vibration is small, as in horizontal and vertical watches, long springs do not have all their turns properly in action, and offering not sufficient resistance to the balance, allow it to travel greater distances too easily. A balance without the balance spring strikes the banking at every vibration, and the number of turns and tension of the spring are the means to be used to prevent this. The vibration of the balance and the time-keeping qualities of the watch are quite frequently destroyed by untrue and badly put springs. Repairs to springs, except of a trifling character, are generally false economy. An hour may be spent trying to reshape and flatten a bad spring in vain, which can be replaced in a few minutes by an expert hand possessing a good stock of springs, and nothing pays so well for keeping.

Upon our first introduction to repairing we astonished our employers by putting a new balance spring to nearly every job that passed through our hands; but objections against doing more than customers would pay for compelled us to desist, and we learned how bad springs and everything else may be in watch work, and yet, as long as they tick, they will time near enough. The want of a direct and easily perceived effect of good or bad work is much needed, as it is only at some remote period that either shows its effects. To replace an old balance spring with a new one, another watch going to time should be on the work board; and having selected a spring by bending the inner turn and placing it so that it bends or catches the cylinder, it may, by lifting it up with the tweezers, cause the balance to vibrate, the bottom pivot touching a smooth surface, such as the top of the glass oil cap. By catching hold of one or more turns and altering the position of the tweezers, the arm of the balance must be made to vibrate in unison with those of the watch going to time, which may be known by listening to one and observing if the ticks correspond with the motion of the loose balance, or by looking at both balances

see if they appear to travel together. If, when this result is obtained, the spring is still a suitable size, the size of the spring being reckoned from where it is held by the tweezers as a temporary stud, by this means a suitable spring can always be secured without the trouble of putting on the collet, and spoiling a number, and wasting time by mere guess work, and watching second hands for time, the spring being suitable, half the balance diameter being reckoned most correct; but, in a case of repair, the position of the stud and index governs the size, and, placing the spring on them, an idea can be gained as to the desirability of fixing any otherwise suitable spring, taking off the pendulum collet from the balance with a fine bladed knife forced under it. We put it on a broach, and resting both on a cork in the vise, we push out with a needle point the pin and throw it away. Fitting a fine, well burnished pin, we do not rip it off, except at the extreme end, where it is marked with a knife, taken out and cut off with the knife. One side of the pin, still on the wire held in the pin vise, is filed and burnished rather flat. Success in getting a spring on well will depend on the quality of the hole in the collet; if bad, it will necessitate much manipulation; if good, the spring is simply put in the hole. The end having been bent to follow the direction of the turns, the pin put in, and, by moving the pin vise, we bring the flat side of the pin in contact with the spring, and it will be in a line by moving the pin. We then nip it off, or previously nick it with the knife and break it off, and then with the tweezers or fine pliers push it home. If too long, the pin must be filed, the safe edge of a fine file pushing the second turn aside enough to carefully file it away. A steady hand is the great requisite in springing.

Should a new collet be requisite, a new one must be made from a brass stopping, or they can be purchased at the material dealers, only requiring slitting, and the holes already drilled. The drilling of a balance spring collet is not easy; in fact, it is the most difficult thing there is to drill, and if the drilling is made easier by drilling in both directions, great destruction of pivot broaches results. In attempting to open a hole that has two directions, a special soft and fine pivot broach is needed to commence the opening. Workmen who whistle and sing over the finest pivoting, generally seem serious when drilling the collet, as drills stick and break, necessitating another collet, or a hole the other side, using the plugged hole as the place to slit the collet to give it elasticity. When the spring is firmly on the collet the first turn cannot be too close to it, but it must not touch it and must form a true or slightly expanding circle with it. It must then be placed in the turns on an arbor, and revolved with the bow and looked at with the glass, to see that the spring revolves truly with the collet and that there is no jumping action with it. If the eye of the spring is much larger than the collet it will be difficult to make it revolve truly; but, in repairing a bad spring, many judicious touches with the tweezers may be given whilst it is on the arbor, and anything like crank action of the spring and collet must be obviated.

The spring must be flattened in the same way whilst revolving with the tweezers, but if properly put on it will not want much altering, as all the alterations are made by bending the turns away from the first turn, which, being held tight, will have quite a different line of action if much alteration is required; if hardened and tempered springs are used none of this bending can be done, and the correct placing of the spring in the collet hole and testing it before it is made quite tight are the only means, and the best means of getting it right; but in repairing the circumstances are more accommodating, and high-class springing is not the rule on horizontal watches. To time the watch quickly the same means used to select the spring may now be used with greater precision, and the spring left under control of the regulator without previous trial. It is of great importance that the curb pins and stud hole are in the same circle and placing them near; if incorrect they should be improved, or a good spring is transformed into a bad one if these are left incorrect; a well fitted pin, flattened and left but little longer than the stud, the flattened pin in the pin vise will, by moving, bring the spring quite flat, if collet hole and stud hole are in the same plane, and saves injurious manipula-

tion with the tweezers. But as these things are seldom right, the ability to manipulate with the tweezers is most useful and necessary to the repairer. Good watches need no "monkeying." The spring must be, when at rest, midway between the curb pins, and, if true, as the circle is a diminishing one, it presses harder on the inner pin at the fast than at the slow, which is what is desired. Inattention to this point often causes regulators to be of no use, as the spring is often very free at the fast and bound at the slow, causing the watch to regulate the reverse way or not at all. In some watches, owing to the bad arrangement, the balance spring, when right size and flat, is in a direct line with the center wheel, and when both wheel and spring are large they touch. Lowering of the spring on the collet or turning the collet, if much brass is between it and the balance, will effect a cure and bring the spring under the wheel. Closing the turns and drilling a new hole in the stud, if that being badly planted, causes the spring to vibrate too far in that direction, may improve it, or the stud may be put nearer the center wheel, causing the spring to throw out in an opposite direction, or the outside turn may be altered to an overcoil or Breguet spring form, which is the very best for watches, all other things being equal.

Any amount of skill and management can be employed on the balance spring, which is the soul of the watch, and skillfulness at this principal branch of watch repairing often constitutes the difference between good and bad watch repairing. Considerable experience and much personal confidence is necessary, and a tendency to shirk the spring appears to be more common than should be among watch repairers.

Depthings.

To Secure a Good Depthing.—The least skillful of watchmakers can, says Claudius Saunier, without much difficulty place a wheel in the depthing tool in conjunction with a pinion, and change this latter until the two are found to run easily together. But there are comparatively few that are sufficiently acquainted with the subject of depthings to be able to select a pinion whose proportions are such as to satisfy the greatest number of conditions to be fulfilled by a good depthing.

This unsatisfactory state of things is due in great measure to the employment, without any correction, of tables of the sizes of pinions, according to which these sizes are determined by a measurement on the teeth of the wheel taken with a pinion calliper. This method, although sufficient for ascertaining the size approximately, and even for securing a depthing that runs more or less easily, cannot be accepted as an unvarying rule.

Far from resting on any mathematical law, as ignorant men urge in their attempt to instruct others, it is only true for a particular number and form of tooth in regard to the wheel, and a definite thickness of leaf and shape of the rounding in regard to the pinion.

It ceases to be true if applied to other numbers of teeth, or to pinions that have their leaves thicker or thinner, or the rounding different from those of the pinion first determined upon.

Theoretical and Practical Depthings.—The fundamental principle of every depthing is as follows: To determine what curvature should be given to the teeth of the wheel which drives, in order that the tooth that follows (whether its side be straight or formed according to a pre-determined curve) shall be driven in such a manner as to secure the best transmission of force—a transmission which is in part influenced by the uses to be made of the machine.

Teeth formed like the involute of a circle have very marked advantages, but they cannot be adopted in practice, especially in the case of the leaves of pinions. The epicycloid can be realized very approximately in the teeth of wheels of horology, and such teeth can be used in conjunction with pinion leaves having straight faces, the construction of which does not present difficulties. This explains why the epicycloid form has been adopted by watchmakers; but,

although it is more easily drawn than the majority of other curves, there are still obstacles in the way of its general application, mainly dependent on industrial requirements. The difficulty is generally gotten over by forming the tooth according to a circular arc, nearly identical with the epicycloidal curve.

When two mobiles are of the same diameter, the theoretical depthing will be characterized by having teeth and spaces of equal width; but, since in practice the friction with such an arrangement would be excessive, owing to its taking place on both sides of the tooth, the teeth of the wheel that is driven are so far reduced in thickness as to secure the necessary freedom.

When the two mobiles are very highly numbered, the lead is short, so that the tooth of the wheel may be a trifle broader or narrower than the space without inconvenience.

But when using pinions of low numbers (from 6 to 10 leads) this is not the case. In proportion as the width of the wheel tooth is reduced, its ogive becomes shorter, and the most advantageous portion of the lead (that beyond the line of centers) becomes less. And, beside this, account must be taken of the slipping toward the end of the lead, and the reduction in the difference between the geometrical and the total diameters of the wheel.

To secure good depth with low-numbered pinions, the leaves should not be more than half the thickness of the space. If they are thicker than this, it may be found necessary to reduce the width of the wheel teeth, when the pitching is insufficient; but the most serious objection lies in the fact that the pitch circle of the pinion will be diminished in diameter. Let there be two pinions with circular roundings and of the same total diameter, but having leaves of different thicknesses—that with the leaves thick will be too small, etc.

To Calculate the Vibrations of a Pendulum or Balance.—Multiply together the number of teeth of the wheels, starting with the one that carries the minute hand (which therefore makes one revolution in an hour), but exclude the scape wheel.

Multiply together the number of leaves of the pinions, commencing with the one that engages with the center wheel.

If the first product be divided by the second, the number obtained gives the number of revolutions of the scape wheel in an hour.

Multiply this figure by *twice the number* of teeth of the escape wheel, and the product is the number of vibrations performed by the balance or pendulum in an hour.

ON THE APPLICATION OF THE GEOMETRICAL LAWS OF DEPTINGS TO PRACTICE.

It has been urged that when the geometrical forms of the leaves and teeth, as given in scientific treatises, are accurately carried out in practice, the depthings are found to be unsatisfactory, and liable to cause occasional stoppage; and these facts are brought forward as evidence that theory and practice are at variance. On the contrary, both are in perfect accord; the apparent disagreement arises from an error in the application of the geometrical laws.

In copying the theoretical forms of the teeth of wheels and leaves of pinions, it would be necessary to ascertain that they were mathematically exact, and this is impracticable. Two conditions must be borne in mind: 1. Theory shows that the mobile which drives should be made a trifle larger than the geometrical size, so as to counteract imperfections in the workmanship; and, 2. A pinion is *never* made of the exact mathematical proportions, in consequence of the processes that have to be adopted for cutting, polishing, centering, etc. If a number of pinions be taken, and if the several dimensions of each be determined by means of a micrometer measuring to hundredths of millimeters (or from two to three thousandths of an inch), differences that are, comparatively speaking, large, will be found in diameters, measuring between corresponding leaves; in the thickness of leaves; in the diameters of the circles at which the roundings join the straight faces, and the general truth of the pinion will nearly always leave something to be desired. It should be added that these faults will be more marked according as the leaves have been more quickly made.

The teeth of wheels will be found to be characterized by similar faults, although they are less marked.

It follows from these facts that, in watches and timepieces, the *pinion is always a little smaller* than theory would require; thus the epicycloid should be struck with a somewhat smaller generating circle, and the ogive of the tooth will be proportionately reduced.

The practical conclusion at which we arrive, then, is as follows: As it is impossible to secure absolute perfection in the teeth of small horological mechanisms, the ogives must be slightly more rounded at the points than the design given in scientific treatises indicate, since these latter are drawn exactly in accordance with the geometrical laws. These remarks are of the greatest possible importance to the manufacturers of both watches and timepieces; they point to the fact that not only the ogives of all wheel teeth should be lower than theory indicates, but also that, in commoner work, they must be still lower, according as the pinions are of more inferior quality.

To Alter a Stem Winding Pinion Depthing.—The depthing of the stem winding wheel and pinion occasions considerable inconvenience, and its adjustment requires to be accurately made; when the depthing is too deep, its alteration is easy, as the roundings of the pinion leaves can be reduced, or the stud or other piece that carries the winding wheel can have its base a little reduced on one side, so as to set the wheels a trifle out of upright (but so slightly as not to be perceptible to the eye, and taking care that the teeth remain on a level with those of the barrel arbor wheel). A shallow depth is somewhat more difficult to correct. If a sufficient change cannot be made by altering the support of the winding wheel, one of the following methods must be resorted to: 1. Reset the pendant of the case; 2. Make a new winding pinion of a greater diameter, increasing the number of its leaves by one, to correspond to this change; 3. Alter the position of the movement in the case.

The two first methods are more especially applicable to new work, while the third is most convenient for repairers, although, of course, it can only be resorted to with advantage when the pinion has a bearing in the pendant. The requisite change in the position of the movement can be produced by raising the rim of the case that supports the plate, or by soldering two thin strips of metal on this rim, producing a similar effect; one on either side of the pendant will suffice, except when a considerable change is necessary, in which case they should be set at intervals round the rim, to avoid an obvious inclination of the dial. Or four holes can be drilled at equal distances apart round the edge of the plate and its plane, so that their edges overlap the position occupied by the rim of the case; pins are then set in these holes and filed away, until they produce the requisite amount of elevation. Or, again, flat-headed screws may be fitted round the edge, with their axis at right angles to the plane of the plate and their heads on the dial side.* The depthing will then be adjusted by screwing these screws more or less into the plate.

It is advisable to ascertain that the dial is not forced too near the glass, as such is occasionally found to be the case, necessitating the bending of the edge of the former.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

Business appears to have suffered a slight check during the month of September—at least things generally have not been so rushing as during the month of August. Jobbers need not and, generally

* It may be well to point out that the above details relate to the case in which the stem winding work is on the top plate. When it is under the dial, of course, the correction here given for a deep and shallow depthing will be reversed.—

TRANSLATOR.

speaking, have not any serious apprehensions on this account, for the reasons for the slight decline lie on the surface and are easily perceived. During the month of August country dealers needed to buy heavily, in view of the annual fairs which draw so many of the agricultural population to the towns, and jobbers were thereby kept very active filling orders. The volume of business done, though satisfactory and encouraging, scarcely realized the sanguine expectations of the country dealers, and the result is that they are hanging back a trifle from further buying until more of their present stock has found a market. That there will yet be an unusually good fall trade, however, seems a positive certainty, even though it should come a little later than some of the most sanguine Chicago jobbers expected. There is an easier feeling in financial circles than there has been for some time, and strong indications that ere October is far advanced money will be easier still. The wheat crop so far has turned out very well, and money is beginning to flow into the hands of the farmers, but it must necessarily be some little time before this will come the way of the jewelers, as the farmer has first to pay the wages of his toilers. As things go, however, he should have an ample surplus, from which the jeweler may fairly hope to derive a fair share. Everywhere, among farmers, manufacturers and wholesale merchants of all lines there is a better feeling than has been known for years past. In railroad circles there is great activity. Many short lines are being built in the West and Northwest, and main lines being filled out. The country thereby is being kept active, and money is circulating freely. The jobber's position at the present time should be, all considered, one of expectation and confidence. The very fact that so many of the leading jobbers in Chicago have been altering, extending and improving their premises shows that they have confidence in the future, and early indications of indemnifying themselves for their expenses.

Benj. Allen reports business good, if a little slower than he would wish. All his travelers give the most hopeful forecasts of the fall trade, and their opinions would seem to be justified by the steady stream of orders that keeps pouring in. Collections, Mr. Allen says, are a shade slow, and not a few country dealers are "begging off." From the great lumber districts of Michigan come the most encouraging reports of all, and, if travelers' words are to be taken, the business in that section of the country should surpass anything done in recent years. From Texas the reports, as might be expected, are not nearly so encouraging, owing to the prolonged and disastrous drouth. In Indiana, Ohio and Illinois, however, there is a ready disposition to buy, and travelers are feeling particularly good. Otto Young & Co. say that they find business quite up to the mark, and have experienced no falling-off. Giles Bros. find the wholesale section of their business showing better returns than the retail. They have most encouraging reports from their travelers, and are expecting an extraordinary good fall.

H. F. Hahn, the Towle Manufacturing Co., Holmes & Edwards, Wendell & Co., Clapp & Davies, Cogswell & Wallis, B. F. Norris, Alister & Co. all give cheering accounts of business done and in prospect, and, while mostly acknowledging a slight falling-off in September business, see the reasons therefor and are not in the least disturbed.

The jobbing jewelers of Chicago are entitled to great credit as having been perhaps the first—if not the first—great body of business men in the United States who extended the hand of sympathy and help to the Charleston sufferers. Before the news of the Charleston calamity was many hours old, Mr. Prall, the enterprising Secretary of the Elgin Watch Company, went around the leading wholesale jewelers with a subscription list, headed with a handsome sum by the Elgin National Watch Company, and within two or three hours over \$650 was ready to go to the aid of poor, suffering Charleston.

Benj. Allen's new premises at Nos. 141 and 143 State street, which are nearly completed and will shortly be occupied by the firm, form perhaps the most complete and certainly the largest jewelers' headquarters in the country. The original plan of constructing on one

floor sufficient accommodation for the business requirements of the firm was found to be impracticable, so Mr. Allen, with characteristic faith in the future of his business, gutted and entirely remodeled the whole three-story block next south of his present premises, and fitted it up in the latest and most approved fashion. The new building consists of three floors 135x40 feet, is approached by one of the handsomest entrances on State street, has the most perfect passenger and freight elevators that Crane Bros. can furnish, and, with its marble-faced hall and stairway, is allowed by visiting New Yorkers to be the best equipped jewelry establishment on the continent of America.

Mr. Ellbogen, of Stein & Ellbogen, has returned from Amsterdam, Holland, with a fine stock of diamonds. His partner, Mr. Stein, has gone to enjoy a well-earned holiday at Sheboygan.

Samuel Swartchild is still ailing, though somewhat improved, but it is expected that he will be around at business again in the course of two or three weeks.

Messrs. Clapp & Davies feel rather indignant over the doings of a sharp imposter, who attempted to do business at New Carlisle, Ind., under one of the firm names. The slick scoundrel represented to a jeweler at that place that he represented W. B. Clapp of Chicago, and wanted on the strength of this connection to sell some goods. The local jeweler was going to Chicago and did not need to buy from a traveler; still he thought it odd that this man should represent W. B. Clapp, who has been out of the jewelry business in Chicago for some time, and was not surprised when he saw the traveler coming out of a drug-store where he had managed to sell one watch-chain "at wholesale." The ordinary traveler whom Clapp & Davies have in Indiana at that time happened to be then in Michigan, and the firm desire it to be understood that no one should be accepted as a representative of theirs who does not carry their duly signed credentials.

It is sad to chronicle that two of the leading houses have been victimized last month by dishonest employes. Philip D. French, a young married man, who for five months was the trusted cashier and confidential man of Lapp & Flershem, contracted gambling habits, and, to repair his losses, abstracted \$101 from the cash-drawer with which to redeem himself. He "blowed it all in" in Hawkins' gambling den, and did not show up the next morning. He was soon arrested in the same choice resort, and owned to what he had done with the stolen money. He was duly brought before a justice and held to the criminal court for trial. Mr. Flershem, with commendable firmness, notified Mr. Hawkins that he must either restore the amount of French's stealings or be prosecuted, and the gambler, without a day's delay, remitted the \$101 to Lapp & Flershem. The firm is inclined to deal leniently with its misguided cashier, and is backing his wife to recover \$140 of her own which her husband lost in the same gaming establishment.

Otto Young & Co. have also to bewail the peculations of a dishonest clerk. W. G. May, an entry clerk, managed to abstract from the surplus stock vaults about \$900 worth of goods, and, when he thought his crookedness would hide no longer, skipped to Milwaukee. He was arrested, most of the stolen goods were recovered in pawnbrokers' shops in Chicago and Milwaukee, and May is now in jail awaiting trial under \$3,000 bonds. W. A. B.

Condition of Trade in Philadelphia.

To the Editor of the Jewelers' Circular:

A rather curious case is coming up in court in a short time involving a question of interest to jewelers. It came about in this way: Mr. O. J. Decxert some time ago made a purchase from a leading New York jewelry house of an assortment of gold studs, purchased as solid. A purchaser a few days afterwards returned one broken, which, on expert examination, proved to be gold plated only. The jeweler notified the New York house, but they had sold his paper. Payment was refused, and suit has been brought. It looks as though

it would resolve itself into a question of veracity. The New York house will no doubt be able to prove that the goods they make, handle and ship, are exactly what they are represented to be, and the Philadelphia jeweler will no doubt swear positively that the returned stud was taken from the stock received from New York.

This brings up a very interesting question. A leading jeweler said to-day that he could not tell what was gold. No doubt he spoke the truth. Manufacturing jewelers know the artifices resorted to—if that is not too strong a term—to sell some kinds of jewelry for something else than what it is. There is more or less freebooting in the jewelry trade; more or less selling of goods for pure which are not pure. The usual means of detection avail but little. Size by size, the good weighs as heavy as the bad, and aqua fortis will not reveal the deception. The question is, what is the remedy? Buyers look only to appearances, but there are a certain class who would scorn to wear or use anything but the very best, regardless of price.

Our leading watch case manufacturers are crowded with orders. The Keystone Watch Case Manufacturing Company, which started out to make silver cases only, has, within the past twelve months, turned its attention to gold cases, and the company is meeting with a demand which has fully justified the wisdom of the departure. The company is, in fact, working night and day. At no time for years has there been as little demand for inferior watches and jewelry as at the present time. Perhaps a better way to put it would be to say that the relative demand for good and ordinary jewelry is decidedly in favor of the finer qualities. This tendency is evident, from the fact that the second and third-class dealers are forced to resort to artificial expedients to stimulate business—such as the instalment plan, and the encouragement of what ought to be called an illegitimate traffic in cheap goods.

Your correspondent has conferred with such jewelers as J. E. Caldwell & Co., and Simons, Bro. & Co., of Chestnut street. They give a favorable account of trade conditions, and are of the opinion that the fall and winter distribution of jewelry will be in excess of that of previous years. Houses of this character leave to others the management of the tag ends of the trade. They are content with the cream.

The love of jewelry is one of those deep-seated weaknesses, or virtues, of human nature which can never be eradicated. Of late years more attention has been given to furnishing the populace with jewelry which they can afford to own and wear. This effort has developed a good many industries. The percentage of people who can afford to buy first-class jewelry is increasing yearly. An enormous amount of trash is constantly thrown on the market, and serves a good purpose in creating the desire and cultivating the taste for something better.

Quite a number of the craft have been absent this summer either in Europe or at American summer resorts. A few have traveled in the far West, taking note of the advance of civilization on the borders. Those who have been in Europe brought back quite a display of attractions and novelties, many of which will no doubt be duplicated in time for the holiday trade. European inventiveness is always bringing out something worthy of notice.

Manufacturers of machinery, used in watch factories and by jewelers, are busier than they have been for many years. Judging the future of the jewelry interests by the demand for machinery, the future of the jewelry trade is bright. In almost every department of industry complaints are made about narrow margins. The same evil, if it is one, crops out among jewelers. Agents who have been seeking new fields are writing back encouraging reports. The trade of Philadelphia is rapidly extending, and the local demand will not fall short of anticipations reported. There is a probability that we will shortly have two or three new firms. A class of enterprising young men are arising in the trade who are anxious to embark in the perilous voyage of proprietorship.

The ambition is a creditable one, but it has happened within

recent years, in some cases, that the experiment was followed with regret. A good salary and certain employment are more to be prized than fine gold.

The manufacturers of mining machinery for Western and Mexican mines are at present in negotiation with New York and Boston companies for a good deal of heavy and costly machinery, designed to extend existing facilities in the Territories, and to supplant the aboriginal methods that have heretofore retarded the production of the precious metals in northern Mexico.

The feeling in trade circles is not at all depressed. The dealers in fine jewelry are not bidding for popular support, but are rather aiming to cultivate the better class of custom and wait for the great body of buyers to develop a more appreciative taste.

QUAKER CITY.

Cold Silvering.



SOMETIMES happens that the country goldsmith or watchmaker has a silver plated article in repair, and not having a battery either in his possession or in working order, he is non-plussed how to restore the silver plating. For doing this, there is nothing so good as the methods described by A. Roseleur, and which are as follows :

Cold Silvering by Rubbing with the Thumb, a Cork, or a Brush.—The results are better than those by the whitening process, but not very durable ; the method is useful to repair slight defects upon more durable silverings, and to produce mixtures of gold and silver, or gold upon slightly gilt objects, thus avoiding the use of resist varnishes. Make a paste by thoroughly grinding in a porcelain mortar, or with a muller, and, as far as practicable, not in the light :

| | | |
|--|---------|---------|
| I.—Water | ounces, | 3½ to 5 |
| White fused nitrate of silver, or preferably the chloride..... | “ | 7 |
| Binoxalate of potash..... | “ | 10½ |
| Bitartrate of potash..... | “ | 10½ |
| Common salt..... | “ | 15 |

or,

| | | |
|-----------------------------|---------|-----|
| II.—Chlorate of silver..... | ounces, | 3½ |
| Bitartrate of potash..... | “ | 7 |
| Common salt | “ | 10½ |

Pulverize finely in a porcelain mortar, and triturate it under a muller upon a plate of ground glass until there is no granular feeling. Keep the paste in a porcelain pot, or in a black glass vessel, to preserve it from the light, which decomposes it rapidly. When about to use it, add a little water so as to form a thin paste, which is applied with a brush or pencil upon the cleansed articles of copper, or upon those gilt by dipping, or even upon those gilt by the battery, provided that the coating is thin enough to allow the copper to decompose the silver paste through the coat of gold ; allow the paste to dry naturally or with the aid of a gentle heat. The chemical reaction is more or less complete, according to the thickness of the gold deposit, and the dry paste is of a pink shade, or entirely green. The salts are removed by a thorough rinsing in cold water and the silver appears with a fine frosted appearance, the brightness of which may be increased by a few seconds' immersion in a very dilute solution of sulphuric acid, or of cyanide of potassium. This silvering bears the action of the wire brush and of the burnishing tool very well ; and it may also be oxidized. Should a first silvering not be found sufficiently durable after scratch-brushing, apply a second or third coat. This silvering is not so adhering or so white on pure copper as upon a gilt surface. For the reflectors of lanterns, the paste is rubbed upon the reflector with a fine linen pad ; then, with another pad, a thin paste of

Spanish white, or similar substance, is spread over the reflector and allowed to dry. Rubbing with a fine and clean linen rag will restore the luster and whiteness of the plated silver.

For Plated Silver Reflectors.—A bath made of water, 1¾ pints ; nitrate of chloride of silver, 2 ounces ; cyanide of potassium, 10½ ounces ; add sufficient Spanish white, or levigated chalk, in fine powder, to produce a thin paste, which is kept in a well-closed pot. This paste is spread with a brush, or a pad of old linen, all over the surface of the reflector, and allowed almost to dry, when it is briskly rubbed over with another clean dry rag of old linen.

Silvering by Dipping in a Warm Bath.—For small articles, a bath is made by dissolving in an enameled cast iron kettle, in two gallons of water, 17½ ounces of ordinary cyanide of potassium. Also dissolve 5¼ ounces of fused nitrate of silver in 1¾ pints of water, contained in a glass or porcelain vessel. The second solution is gradually poured into the first. Stir with a glass rod. The white or grayish-white precipitate produced soon dissolves, and the remaining liquor is filtered, if a perfectly clear bath is desired. When brought to the boiling point it will immediately silver the cleansed copper articles plunged into it. The objects must be quickly withdrawn. The silvering should immediately follow the cleansing, although the rinsings after each operation should be thorough and complete. This bright and light silvering is adapted for set jewelry, which cannot be scratch-brushed without flattening the clasps, and to which a bright luster is absolutely necessary as a substitute for the foil of burnished silver placed under the precious stones of real jewelry. The employment of the solution of nitrate of binoxide of mercury is useless ; and even injurious for this bath. It is useless to keep up the strength of the solution by new additions of cyanide and silver salt ; thus revigorated, it gives results far inferior to those of the former solution. The baths should, therefore, be washed out as long as the silvering is satisfactory, and when exhausted, put away with the waste. With this process a battery and a soluble anode may be used to obtain a more durable deposit ; but the operation is no longer a simple dipping, and properly belongs to electro silvering by heat.

A solution which, when boiling, produces a very fine silver coat, with a mat, or partly mat, luster, upon cleansed copper, is made by dissolving, with the aid of heat, in a well-scoured copper kettle : Distilled water, 9 pints ; ferro-cyanide of potassium, 21 ounces ; carbonate of potash, 14 ounces. When the liquid boils, add the well-washed chloride obtained from 1 ounce of pure silver. This should boil for about half an hour, and be filtered before using ; part of the silver deposits upon the copper kettle, and should be removed when a new bath is prepared. On account of this inconvenience, the process has been nearly abandoned, although the products are remarkably fine. All the dipping silver baths which contain a comparatively great excess of cyanide of potassium to proportion of the silver salt will silver well copper articles perfectly cleansed, even in the cold ; whereas, this characteristic diminishes in proportion to the increase of the amount of silver in the bath, or with the decrease of the amount of cyanide. For small articles, partly copper and partly iron, such as those used for saddlery and carriage wares, a particular process of silver is used. The bath is composed of :

| | | |
|------------------------------|---------|----|
| Water | pints, | 9 |
| Caustic potash..... | ounces, | 6 |
| Bicarbonate of potash..... | “ | 3½ |
| Cyanide of potassium..... | “ | 2 |
| Fused nitrate of silver..... | “ | ¾ |

The cyanide, caustic potash and bicarbonate are dissolved in seven pints of water in an enameled cast iron kettle, then the remaining quart of water, in which the nitrate of silver has been separately dissolved, is added to the former solution. For the silvering operation, a certain quantity of articles are cleansed, thoroughly rinsed, and put in a small enameled kettle. Enough of the silver bath is poured in to cover the articles entirely, and the

whole is brought to a boil for a few seconds, and stirred with a wooden spatula. When the silvering appears satisfactory, the liquor employed is put with the saved waste; the same liquid is never used for two batches of articles. This process gives a somewhat durable silvering with a dead luster of a grayish-white, which is increased in whiteness and brightness by soap and burnishing.

Mineralogical Notes.



ON MAY 30th, 1886, Mr. George F. Kunz presented the following description and illustration of the large garnet which was exhibited for him at the meeting of December 7, 1885:

The finest large garnet crystal ever found, perhaps, in the United States, was discovered, strange though it may

be, in the midst of the solidly-built portion of New York City. It was brought to light by a laborer excavating for a sewer in West 35th street, between Broadway and Seventh avenue, in August, 1885. A quartzite vein, traversing the gneiss, contained the crystal. The laborer took it to Mr. J. J. King, from whom I received it.

The accompanying plate, engraved by our fellow-member and mineralogist, Mr. B. B. Chamberlin, is a faithful representation of this interesting garnet.

In form the crystal is a combination of the 2-2 tetragonal tri-

angular dodecahedron (trapezohedron), the predominating form, and 1-dodecahedron, and 3-2 hexoctahedron.

It weighs nine pounds ten ounces (4.4 kilos), and measures fifteen cm. (six inches) in its greatest diameter, and six cm. on its largest trapezohedral face.

Twenty of the trapezohedral faces of the crystal are perfect, while the remaining faces were obliterated in the formation of the crystal by pressure against the quartzite matrix.

On the surface the color is a reddish-brown, with an occasional small patch of what is apparently chlorite, which greatly enhances its beauty. On a fractured surface, however, the color is a light almandine, and the material in the interior of the crystal is found to be very compact.

This "find" is of peculiar interest, because within the past few years large garnets have been brought to light at other localities in this country, notably at Salides, Col.,* where large almandine crystals occur, which are very perfect, and are coated with a chlo-



ritic schist, readily removed by an acid, leaving the garnet with clean surfaces, though not smooth. Crystals weighing from five to ten pounds, and one weighing fourteen pounds, have come to the writer's notice. They are in a chloritic schist which is so soft that they can be taken out unbroken. In form they are almost without exception rhombic dodecahedrons, 1-.

In Burke County, N. C.,† near Morgantown and Warlick, where

*Vol. xxxiv., A. A. A. S., 1885, meeting, p. 241.

†American Gems, in "Mineral Resources of U. S.," Wash., 1883-'84, page 746.

garnets are mined for emery purposes, they are found in sufficient quantities to warrant the establishment of grinding mills.

They are usually coated with a hydrous oxide of iron from a superficial decomposition, but are sometimes compact enough internally to be cut into slabs several inches in size, or even into small dishes. Some of these crystals which have come into my possession weighed twelve pounds. A few weighing eighteen pounds have been found. They are usually quite perfect on every face, the trapezohedron 2-2 being the common face.

Although both of the above localities have afforded larger crystals, yet no finer crystal of its size than the one here illustrated has ever come under the writer's notice. The finding of a single isolated crystal is not singular, as garnet and tourmaline are often so found.

Rock Crystal in History, Superstition, and on its Cutting in Japan, Germany and the United States.*

[By GEORGE F. KUNZ, New York, N. Y.]

(Illustrated with crystal spheres and other objects of transparent quartz, including some of the largest pieces in the country).

Pliny, Seneca and many other ancient writers, as well as the early fathers of the church—Austin, Gregory, Jerome, etc.—firmly believed that rock crystal was but water congealed by a cold so intense that ordinary methods could not melt it. Pieces of rock crystal were undoubtedly used by the ancients for burning glasses, and Pliny says: "I find it asserted that when any part of the body requires to be cauterized, it cannot be better done than by means of a crystal ball held up against the sun's rays."

Orpheus recommends the employment of the crystal ball to kindle the sacrificial fires, adding that though a kindler of flame, the ball, strange to say, is icy cold when snatched from the midst of the fire.

Pliny mentions a crystal trulla which was purchased by a lady of his time for \$1,500; and the story of Nero's breaking two cups engraved with subjects taken from Homer, when he was informed of his deposition by the Senate, is familiar to all.

A mass of crystal weighing fifty pounds was dedicated in the capitol by Livia, the empress. Mention is also made of a crystal bowl with a capacity of four sextarii or two quarts.

Sir Thomas Brown, in his famous "Vulgar Errors," published in 1646, says that crystal is nothing else but snow or ice congealed, and by time congealed beyond liquation—the Greek word *krystallos* meaning ice.

Crystal balls are not of Japanese origin only, as is commonly supposed, but have played an important part in the occult sciences of various nations, and were extensively used by soothsayers and other wonder-workers in their time.

Some State papers of the reign of Queen Elizabeth contain some curious documents bearing upon alchemy, magical glasses and magic in general, as follows:

"Again in the year 1570† a crystal stone was in request in order to discover certain money which was stated to be hidden in a house in Kent, and a spirit, by name 'Oryenee,' was summoned to appear in this crystal to answer questions; but‡, as might be expected, he failed in his appearance." * * * "And hereupon he went unto the said Mr. Bowkeley and desired hym to tell hym who hadde stollen the sayd monny, who awnsweryd hym that he could not well tell, but sayd that he wold cast a fugar for hyt, and so dyd in very dede, and sayed that he dyd lowke in a cristall stone for hit, but for all that he colde fynde nothing." * * * "returned to their cabin wch they had made under a great tree in the said closse of the said Robert Hewes (*otherwise called Robert Carpenter*) wth certen cirkells on the ground within the said cabbyn and one of the said cirkells

was laid about with parchment written uppon with crosses and by the said cabbyn we found a stoole with divers pottes by the same stoole and a red cock beinge dead by it and againste the said stoole a fayre cristall stone with this word (sathan) written on yt."

Spherical objects of crystal and stone have been repeatedly found with remains of the Saxon period, which may be regarded as amulets or connected with divination.

An interesting account of the finding of such relics of the conjuror's art in the ancient graves of Warwickshire is given in the *Archæological Journal*, vol. IX., p. 336-338, as follows: Albert Way, in his "Notice of a Saxon Brooch found in Warwickshire," 1852, mentions a crystal ball suspended in a silver frame attached to two rings of the same metal, which was found by Douglas in a tumulus on Chatham Lines. He speaks of the finding of a fibula at Frankford which has a small ring on the reverse of its smaller extremity, doubtless for the suspension of some object of an ornamental or talismanic nature. The conjecture seems not inadmissible that the large perforated crystal found with the fibula at Mayton may have been an amulet, appended to it by means of a string or thong, which might readily be attached to the *acus* on the reverse of the brooch. A similar perforated crystal of quartz, of much smaller dimensions, may be seen in the museum of the Society of Antiquaries. It was found with ashes, in an urn, near Hunsburg Hill, Northamptonshire. This crystal measures about 1½ inch in its greatest diameter. Still another is figured by Mr. Wylie in his "Fairford Graves," Pl. 4. And in *Archæologia*, vol. XXXIV., p. 46: In a curious memoir on ancient beads we have the following interesting remarks bearing on the subject of these balls or amulets: "In our museum at Bristol a fine agate ball was exhibited by Mr. Henry C. Harford, who stated that it was found in an Archdruids tumulus in Cornwall. It may be interesting to recall that in the same collection a large perforated agate bead was shown by Mr. Augustus Smith, found singly with massive bronze armlets, in a tumulus in the Scilly Islands. In reference to balls of crystal found in Saxon graves, it may suffice to refer to the *Nenia*, pp. 14-19. Such a ball was found in the tomb near Lournai, usually assigned to Childeric, who died in 1841. Large perforated beads of crystal have likewise been discovered with Saxon remains. * * * Imperforated beads of unusual size, and formed of richly variegated glass, have been found in several instances." * * * "Spherical objects of crystal and stone have been found repeatedly with remains of the Saxon period. They may be regarded as amulets or as connected with divination; and such an object has sometimes been compared with the *orum augurium* of Pliny, or the 'glain veider' (serpents of glass) of Cornwall and Wales."

In its smaller forms, pure quartz is held by the Japanese to be the congealed breath of the White Dragon; and in its larger and purer forms they hold it to be the saliva of the Violet Dragon. The belief of the ancients, both Orientals and Occidentals, was that quartz-crystal was nothing but pure water congealed by intense cold and found only in the regions of eternal frost, hence the name of rock-crystal was *clear ice*, and the one word served alike for the stone and for ice. The Chinese and Japanese word "suisho" reflects a similar idea, meaning "substance of water," and the theory of its production was part of the pagan conception of the universe. Of the nine kinds of dragons in the pagan world of imagination, several have much to do with the preservation of the hidden treasures of the earth and the deep. They guard these jealously, and diver and miner ever run the risk of exciting their anger.

Sir Thomas Brown in his "Hydrotaphia or Urne Burial," chapter II., p. 9, notices a Roman urn preserved by Cardinal Farnese, in which were found a crystal ball and six nuts of crystal, three glasses and two spoons, besides a great number of gems engraved with heads of gods and goddesses, an ape in agate, and a grasshopper and an elephant of amber. Two other urns which were discovered had "a kind of opale in each, one yet maintaining a bluish color. Some of these trinkets were doubtless the dearest treasures of the deceased,

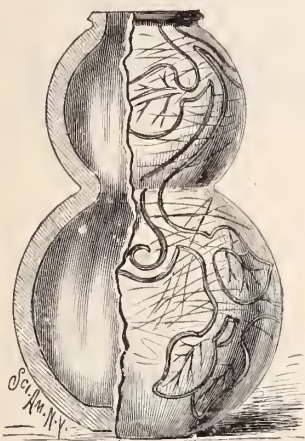
* Read at New York Academy of Sciences, May 30, 1886.

† (State Papers Dom. Eliz., 1570, Vol. 71, No. 63, i.)

‡ (State Papers, Dom. Eliz., A. D. 1590, Vol. 233, No. 72.)

in which they took great delight when living, and were deposited with their ashes by friends for use in the other world; or, perhaps, the desire to remove from sight everything that, from its associations with the departed, could awaken grief may have prompted this action in some cases.

In the "Museum Britannicum, being an exhibition of a great variety of antiquities and natural curiosities belonging to that noble and magnificent collection, the British Museum, illustrated with curious prints and explanations of each figure, by John and Andrew Van Rymdsdyck, Folio, London, 1778," we find curious illustrations of our subject. Plate XVIII., fig. 5, page 46, is thus explained: "A round crystal ball, exceedingly brilliant, very often found in sepulchres—likewise an amulet." * * * "Are often found in sepulchres with a variety of other gems, etc., which they left with the dead as guardians of the manes." Montfaucon ("Monumens de la Monarchie Française," vol. I., p. 15,) mentions the finding of a globe of crystal in the monument of Childerick, and adds that in another sepulchre no less than twenty balls of crystal were found. There are two hundred and sixty-six pieces of rock-crystal in the Green Vaults at Dresden, many of which were numbered among the treasures of the Vaults and the Chamber of Art before 1640. A large part of the present collection was purchased by August the Strong in Italy, and cut by the renowned worker in crystal, G. B. Metellino, of Milan. The material came originally from Switzerland, Savoy and Hungary, some, however, being contributed by the Emperors of Austria.



Double-bulb vial of rock-crystal penetrated by acicular crystals of hornblende.

of crystal known is in the Dresden Green Vaults (No. 174 Preziosensaal); it weighs 15 German lbs. and is 17 cm. in diameter. In olden times it was probably used by masters of the occult sciences in prophecying and wonder-working.

The famous clock in the form of the Tower of Babel, made by Hans Schlotheim, a clockmaker of Augsburg, contains a crystal ball which plays a very important part in its diurnal labor. Every minute this ball comes out on the top of the clock by means of ingenious mechanism, and, running down around the tower, falls in below, where, rebounding from a lever, it retraces its course.

Crystal balls were used, nearly a century ago, for the feet of pianos, and were also employed by the ladies of the period for cooling the hands. The Italians of the present day use them for the same purpose.

Crystal vials are manufactured so cheaply that one 2 inches in height, forming two hollow spheres, placed on the other and both hollowed out from one end, the perforation leading to each ball not being over one-fourth of an inch in diameter was sold for \$11, although it was beautifully penetrated with acicular crystals of hornblende.

Crystal bottles have been sold to fashionable people here for many years, and, as is often the case with articles of American taste and ingenuity, bottles, not only finer in form, but also of a workmanship and carving much superior to any that have been brought from Japan,

have found a ready sale at from four to five times the prices of Japanese bottles of the same size.

The only rock-crystal object in the United States for which a piece of crystal of the largest size was required is a round disk, $9\frac{7}{8}$ inches in diameter, on which is cut in intaglio the episode of Moses in the bulrushes. This rare specimen is in the possession of Tiffany & Co., and is exhibited here this evening. This remarkable piece was unfortunately dropped by the engraver after completion, and is now in two pieces; but this mutilation does not prevent us from realizing what a fine specimen of rock-crystal it was originally.

The Japanese methods of working crystal are very simple. Skill, patience and hereditary pride make up for any lack of labor-saving tools, for there the workman can often trace back his pedigree in unbroken line to twenty generations. The crystal is first roughly dressed into proper pieces for forming crystal balls or other objects. If the piece is too long to be formed into a ball it is broken into



Japanese method of grinding and polishing crystal balls.

several pieces. If it is a large compact mass it is only chipped on the edges. In order to break large, thick crystals, a nick is often hammered round them, and then a sharp, well-directed blow will make a clean break. The masses, whether large or small, are gradually rounded by careful chipping with a small steel hammer, this rude tool alone sufficing to make a perfect sphere. The workmen thoroughly understand the fracturing of the crystals and apply either chipping or hammering as the case may require.

The crystal then being in a spherical form, but with its exterior rough, is handed to a grinder, who has a number of cylindrical pieces of cast iron about 1 foot in length and resembling reversed graters, which are of different thickness and variously curved according to the size of the crystal to be ground. The grinding material consists of powdered garnet and emery, fine or coarse, as required. Water is used plentifully, and the ball is dexterously kept turning so that the surface is made perfectly spherical. In some cases the ball is fixed in the end of a bamboo tube and kept whirling in the hand of the workman until it is smooth. The perfect polish desired can only be produced by patient rubbing, first with the tip of a bamboo cane and then with the hand, dipped in rouge (hematite), which gives a splendid lustrous surface. The perfect *tama* (jewel ball) is then ready for its wavy throne of bronze or its nest of satin. A favorite native proverb is: "Until polished the precious gem has no splendor."

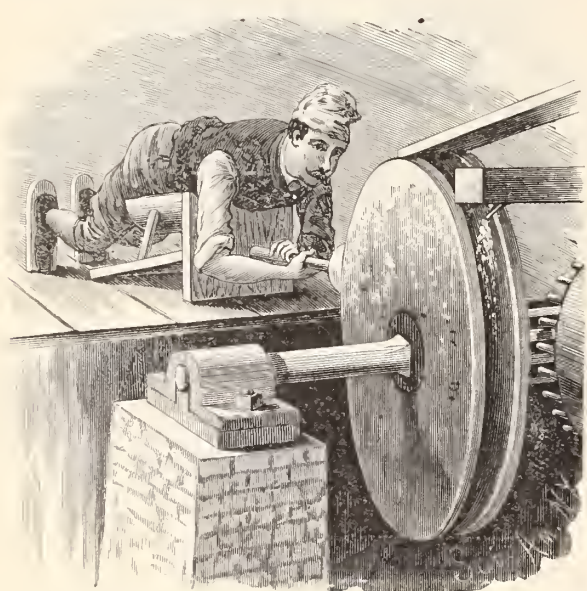
This method of manufacture is very laborious and slow, and, were it not for the cheapness of labor, it would be a very serious item.

In Germany, France and the United States, the balls are not made

by hand as in Japan, but the piece of crystal is placed in a semi-circular groove, worn in huge grindstones either by a piece of flint or a crystal pebble, and held there while the stone is revolved, until in a short time it assumes a shape the exact counterpart of the semi-circular groove in the grindstone. Care is required during this operation not to allow the wheel to become dry, but to keep it constantly wet, since the friction will soon heat the crystal, and, if water is then put on the wheel, the crystal is liable to crack just as it does if it is heated and then dipped into water.

The polishing is then done on a wooden wheel with tripoli, or else on a leather buff with tripoli or hematite. By this method, which has been in use from the latter part of the sixteenth century, or even earlier, up to the present day, crystal balls have been manufactured without the requisition of more skill than that necessary in turning out a common semi-circular piece of agate for a bracelet or other ornament.

The crystal cups, vases, pitchers and other similar objects of the sixteenth and seventeenth centuries now in the Louvre, the Dresden Green Vaults and the Schatzkammer of Vienna, are infinitely superior to any such simple work as these spheres of crystal. Many of them are to-day faithfully reproduced in Vienna, a number having found a ready sale in the United States during recent years. Two fine



Methods of working rock-crystal, agate, etc., in Germany, France and United States.

examples of this class were in the Morgan collection. They are crystal dishes, measuring from 4 to 6 inches across, beautifully engraved in intaglio and mounted in silver and gems, and are as rich as the originals in the Vienna collection.

Many small crystal objects of foreign manufacture, such as spectacles and small balls of $1\frac{1}{2}$ inches diameter, can be purchased in New York, notwithstanding duty, cheaper than they can be cut here, unless a large order is given. There are regular quotations by which balls can be ordered from the Oberstein factories.

Three parties in the United States have machinery, such as is used in the crystal-cutting works of the Oberstein district, and are prepared to manufacture perfect spheres of rock-crystal, from furnished material, at the following average prices: 1 inch diameter, \$1; 2 inches diameter, \$5 to \$8; 3 inches diameter, \$15 to \$25; 4 inches diameter, \$40 to \$75; 5 inches diameter \$125 to \$150; 6 inches diameter, \$200 to \$300; 7 inches diameter, \$300 to \$400.

A crystal sphere $6\frac{3}{8}$ inches in diameter would lose in recutting, in order to remove a "bulb of concussion," one-fourth of an inch. The estimated cost of recutting such a sphere was, in New York \$50 to \$75, and in Japan \$50.

The facilities for working hard stone in the Oberstein Idar, in Oberstein, are so good that a dish of agate 13 inches long, 8 inches wide and over 3 inches deep, and hollowed out to $\frac{1}{8}$ inch in thick-

ness, was sold for \$200 in New York after passing through the hands of three dealers and paying a duty.

The $6\frac{1}{4}$ inch ball, hereafter quoted as weighing 15 lbs. Troy, was offered for sale at \$400, and the cost of cutting it was probably not more than one-fourth of that amount. It will thus be seen that at Oberstein it is not the cost of the turning of rock-crystal into spheres that is the cause of the high prices, but simply the *extreme rarity of masses of rock crystal which will afford absolutely pure spheres from $3\frac{1}{3}$ inches in diameter upwards*. The great rarity of these masses and the constant demand, which at all times has been greater than the supply, warrant the prediction that prices will be higher rather than lower. The United States, with its host of collectors of fine Japanese pottery, bronzes and other curios, who do not hesitate to spend thousands of dollars for a single object, cannot boast of the possession of half a dozen perfect crystal balls over 5 inches in diameter.

Dealers themselves are often ignorant of the true reason why crystal balls are so expensive, and being interrogated on this point, may answer that the difficulty of cutting them is the cause of the high price at which they are held.



Largest crystal ball in the United States, $6\frac{3}{8}$ inches in diameter.



Japanese crystal ball on bronze stand representing crest of waves.



Russian vase of rock-crystal, 5 inches high.

Among the French crown jewels is a crystal ball measuring $6\frac{1}{2}$ inches in diameter. One in the possession of Mr. R. E. Moore measures $6\frac{5}{8}$ inches in diameter, and is valued at \$5,000. This ball was purchased in Japan twenty years ago for \$4,000. Mr. Samuel M. Nickerson, President of the First National Bank of Chicago, owns a fine ball measuring $5\frac{5}{8}$ inches in diameter and valued at \$2,500, which was brought to this country by Commodore Perry. In the possession of Mr. Brayton Ives is one measuring $5\frac{5}{8}$ inches, estimated to be worth \$3,000; and Mr. Heber R. Bishop has one measuring $5\frac{7}{8}$ inches in diameter, which was sold for \$1,250 at a New York sale. Mr. W. D. Walters, of Baltimore, owns another measuring $5\frac{3}{4}$ inches in diameter; Mr. Pruyn, of Albany, one $5\frac{1}{2}$ inches in diameter; and Mr. James F. Sutton, of New York, one $5\frac{5}{8}$ inches in diameter. A crystal ball in the Harper collection, measuring $4\frac{1}{2}$ inches, was sold last week to Mr. Hiram J. Sibley for \$1,600, while one of exceeding purity in the Morgan collection was $4\frac{1}{2}$ inches in diameter, mounted on a silver stand ornamented with a gold dragon and other grotesques, and containing the private or palace seal of

the Mikado. It sold for \$1,750, and the stand alone was estimated to be worth \$800.

During the preparation of two articles on precious stones for the Geological Survey, the writer had occasion to examine almost all our public and private collections, and to write hundreds of letters of inquiry on the subject of American gems and gem minerals, but has so far failed to learn of any masses of rock-crystal in the United States that would produce a perfect three inch ball. (See page 550, "Mineral Resources of the United States," 1883-1884).

Several pieces that would have afforded balls from three to four inches in diameter were brought to light, but they were so filled with veinings that the material had been used for other purposes. A ball measuring two and a quarter inches in diameter was cut for the writer in August, 1885, which, although beautiful, was not perfect internally.

The rarity of large masses of pure crystal is such that a well known dealer has a standing offer of one thousand dollars for a five inch crystal ball, fifteen hundred dollars for a five and a half inch ball and four thousand dollars for a seven inch ball. It is said that these prices are only one-third of what they are worth in Japan.

The New York representative of a Japanese trading company received the following response on sending an order for crystal balls to Japan: "None produced. None of any size for sale. Have an offer of three thousand dollars for a perfect four and a half inch ball."

After extended inquiry in New York, London, Paris and other large cities, as well as in Japan and Brazil, the writer concludes that crystal balls or material to furnish them from one to three inches in diameter can at any time be procured from either Japanese, Madagascar, Swiss or Brazilian rock-crystal. Several tons of material that would furnish balls from one to three inches in diameter have been recently sent to this market from Brazil, because the foreign markets are glutted with balls of these sizes. An order which was given out some years since for crystal slabs measuring four by six and five by six inches, and from one-quarter to one inch in thickness, has remained unfilled to this day, although it is well known to dealers both in this country and in the principal European markets.

Rev. C. W. King mentions in "Antique Gems," p. 93, having seen a rolled crystal over one foot in length, of a perfect egg shape and of admirable transparency, which was part of the plunder of Delhi.

Imperfections in rock-crystal are usually small seams or flecks of white clouds, produced either by fracture, inclusions of impurities, or, as is often the case, microscopic cavities filled with liquid carbonic acid gas or water. Another imperfection is the "bulb of concussion," as it would be termed by archæologists. This is produced whenever a mass of crystal or agate receives a sharp blow from being dropped on the floor, struck forcibly with a mallet or from other cause; a funnel-shaped flaw is produced, the small end being at the surface of the crystal. If no further blow be given, the flaw may still develop toward the interior of a crystal. Bulbs of concussion can be seen in any agate mortar that has been extensively used in the laboratory. Dozens have been observed in a single mortar. In the breaking of flint this same structure is developed.

It might be possible for a ball containing one or more of these bulbs of concussion to be polished on a sandstone wheel, as is done at Oberstein, but the flaws are likely either to develop toward the center of the mass or else flake off to one side and ruin the entire crystal.

To determine whether a crystal is perfectly spherical it should be put into a bath of mercury. The lightest part will always come to the top.

The Japanese occasionally deceive unsuspecting persons by selling to them glass imitations of crystal. A single glance would be sufficient to detect the fraud, if the purchaser had ever seen a pure, pellucid crystal ball, since it is impossible to produce such a large

piece of glass entirely colorless. If the imitation ball is placed beside a genuine crystal the difference is at once apparent.

The following is a table of the weights of crystal balls of different sizes:

| | LBS. | OZ. | DWT. | GRS. |
|-------------------|------|-----|------|------|
| 25 mm. or 1 inch, | — | — | 14 | — |
| 35 " " 1 3/8 " | — | 1 | 18 | — |
| 40 " " 1 5/8 " | — | 3 | — | 9 |
| 45 " " 1 3/4 " | — | 3 | 13 | 12 |
| 54 " " 2 1/8 " | — | 7 | 1 | 12 |
| 64 " " 2 3/8 " | — | 12 | 10 | — |
| 3 1/2 " | 1 | 6 | — | — |
| 6 1/4 " | 15 | — | — | — |

Most of the rock-crystal used to-day comes from Madagascar and Brazil. Friedeberg, Salzburg, Zillerthal in the Tyrol, Hungary and Ceylon contribute more or less sparingly to the general supply; North Carolina, California and other American localities furnish some material which is rarely used, owing to the small size of the crystals and the cheapness of the foreign mineral.

In 1735 the yield from the Cave of Zinkenstock, near the Grimsel, was valued alone at £2,250. It is also found in small quantities at Jochle Berg in the same region.

Fischbach, in Visperthal, afforded the crystal for the pyramid of Marsfeld, made in 1797. This block, which is a cluster measuring three feet in diameter and weighing over eight hundred pounds, is now in the Museum of Natural History at Paris.

The neighborhood of Mt. Blanc yields beautiful clear crystals, the preparation of which for sale gives lucrative employment to the inhabitants of the vale of Chamouny.

At Galenstock, above the Tietengletscher, a most remarkable deposit was found in a granite cave, which yielded over one thousand crystals of from fifty to three hundred pounds weight, but unfortunately of a smoky color. The finest of these crystals, weighing one hundred and twenty-five pounds, and called the *President*, is in the celebrated collection of Mr. Clarence S. Bement, of Philadelphia. Of the others, perhaps the best are at Berne, Switzerland—one called the *Grandfather*, weighing two hundred and seventy-six pounds, and another, known as the *King*, of two hundred and fifty-five pounds weight.

A crystal of thirty-eight centimeters in height and nine centimeters in diameter, from Savoy, is now in the Dresden Green Vaults.

In Japan, nineteen mines are now being worked for quartz and rock-crystal. The latter material is found in large clear masses in the mountains on the Island of Nippon, Fusi-yama and in the granitic rocks of central Japan, the principal veins being near Kami; but is also found among the gravel beds, where transparent masses that would furnish perfect spheres six inches in diameter have been dug out. In Murray's "Handbook for Japan," 1884, on page 201 we find the following: "Close to Kami Kurobera are the principal veins of rock-crystal." On page 203: "A short way on a track (on the ascent of Koma-ga-take) leads to the left to a crystal mine, formerly worked by a private company, but now from want of funds entirely neglected." * * * "By going this way (on the path around the yama in the ascent of Koma-ga-take) and descending to the lower part of the ravine, a crystal mine can be visited which was not, however, being worked in 1881." Some suppose, however, that much of the Japanese crystal is procured from China, and, from statements made to the writer by members of the Korean Embassy that recently visited us, it seems probable that the peninsula of Korea has furnished some of the material for these Japanese objects. It was further learned from them that there are at present twelve workers of crystal in Korea.

Obituary.

MR. E. W. DENNISON.

The death of Mr. E. W. Dennison, head of the Dennison Manufacturing Company, is announced, having occurred on Wednesday,

September 22, at his residence, Marblehead Neck, after an illness of several months. Mr. Dennison was born at Topsham, Maine, November 23, 1819. He was one of the ten children—three boys and seven girls—of Colonel Andrew Dennison, one of the early pioneers of the Androscogin section of Maine. One of his brothers was Mr. A. L. Dennison, the father of the American watchmaking industry, and inventor of much of the earlier machinery employed in the making of watches. A sketch of his early efforts in this direction appeared in a recent number of THE CIRCULAR in the very interesting series of articles on the history of watchmaking, by Mr. Crossman. At the age of sixteen Mr. E. W. Dennison removed to Boston and entered the watchmaking and jewelry establishment of his brother, where he remained for some time. He eventually established himself in the jewelry business at Bath, Maine, but not meeting with the success that he anticipated he gave up the business and returned to Boston. While at Bath, however, he met Miss Lydia A. Beals, to whom he was married at a subsequent period. The fortunes of Mr. Dennison were not prosperous in these early days, and he fluctuated from one business into another, being clerk in a shoe store, in a dry goods store and in jewelry houses for various periods. It was about this time—1844—that Mr. A. L. Dennison conceived the idea of establishing his father in the business of making paper boxes for jewelers. Previous to this time special boxes for jewelers were not made in this country, but a few were imported and found ready sale without, however, giving entire satisfaction. Colonel Dennison at once caught at the proposition and commenced making paper boxes for the trade by cutting them out with a knife, and, with the assistance of his daughters, making them up by hand. The first lot that he brought to Boston found ready sale, and he secured numerous orders for future delivery.

This was the foundation of the immense business that has since been conducted by the Dennison family, and is now continued by the Dennison Manufacturing Company. As the business grew, machinery was devised for the saving of labor, and Mr. E. W. Dennison became associated with it as business manager. He established the New York house, and his inventive brain soon devised additional lines of goods for the company to handle. One of these is the result of a patent taken out by him for the manufacture of tags, those very useful little cards which are now so commonly used in addressing parcels. During the first year after the patent was issued ten millions of these little articles were sold, but the sales at the present time amount to over two hundred and twenty-five millions a year. They are known everywhere, and in every line of business they are found a convenience and a necessity. He also added the manufacture of jewelers' cotton, another article which had previously been imported. The business continued to grow under his able management, being developed according to the requirements of the jewelry trade and the commercial interests of the country in general, drifting largely into the manufacture of stationers' supplies. The jewelers' box business has developed from the manufacture of the small paper boxes used in packing jewelry for the trade to the beautiful and elaborate plush cases that now constitute a portion of every lady's personal equipment and figure so largely in holiday and other presentations. Another important feature connected with the manufacture is the production of cards for jewelers, on which to fasten the various articles of their manufacture. These cards are manufactured in enormous quantities and in sizes as required by the trade. The consumption of bristol board in connection with this branch of business is so immense that the company was forced some time since to purchase a large paper mill that is devoted exclusively to the manufacture of this class of board. They have their factories at various points, their card factory occupying an immense building at Roxbury, their box factory being located at Brunswick, another immense structure; while in Boston they occupy a very large building for their warerooms, in addition to their central offices or headquarters. The company have branch offices established in New York, Philadelphia, Chicago, St. Louis, Cincin-

nati and London, while their export trade is something immense. This immense business has been built up mainly through the foresight, energy and business capacity of Mr. E. W. Dennison, and the able assistants with whom he surrounded himself. Being an excellent judge of human nature, he had the happy faculty of always selecting the right man for every position, and, as a consequence, the business is so organized that it is ably manned in every department. As already indicated, this business now of such magnitude, employing hundreds of workingmen and women, was built up from nothing. In fact the Dennisons, father and sons, created a new industry having great commercial importance. To Mr. E. W. Dennison is due the credit for the greatest development of this enterprise and for its successful financial management. Personally, Mr. Dennison was a genial whole-souled gentleman, full of generous impulses, kindly disposed to all who came in contact with him, but impressing all with a sense of his own indefatigable vigor and enterprise. He was well known and cordially liked in the jewelry trade for which he had done so much in simplifying the details of the business. For the past two or three years Mr. Dennison had been gradually withdrawing from active participation in the management of the company that bears his name, placing the responsibility in the hands of younger men, so that while these will miss their kind counselor and friend, the business interests of the company are left in the hands of those careful and trustworthy men whom he had selected as his lieutenants and successors. The deceased leaves a wife and several children.

Apprentices and Trades Unions.



HERE IS, probably, no more objectional feature in what is known as the "unions" of various mechanical trades than certain regulations prescribed as to the number of apprentices that may be employed in each establishment. The number of boys and young men seeking the opportunity of learning trades, and prevented by these tyrannical rules, is larger than those not familiar with the facts would suppose. The unquestioned injustice of these regulations is patent to every one, except those interested in maintaining them. In every city in the United States, there are, to-day, very many boys of respectable parentage and good character who have no desire to become members of either of the learned professions, who do not want to be employed as clerks, but who earnestly desire to learn some one of the useful mechanical trades in order to be able to secure in the future an honorable position in society and an assured competence. But the avenues to such labor are absolutely and despotically closed by these regulations of the trades "unions," and, as a consequence, these boys are thrown on society, compelled to be idle and dependent, and readily drift into vice and wickedness.

The evil cannot be overestimated. The great danger in the present condition of society in this country is the tendency to seek the means of procuring a living in some other way than by daily toil. It fosters idleness and begets dishonesty. And the opportunities for learning any of the mechanical trades should not be embarrassed by a single impediment. Young men and boys should be urged, invited and encouraged to learn some trade by which they can secure steady employment and earn a competent support. The criminal outrage on society produced by these "union" regulations concerning apprentices, is telling with fearful results, especially in the large cities, in the great number of young men driven to idleness and consequent crime. So grievous has become this complaint that, in the interest of philanthropy and public morals, the legislatures of some of the States have attempted to remedy the evil by the passage of a law correcting the abuse.

If no other means can be obtained to secure this object, every

State should pass a law so stringent in its terms, and so severe in its punishment, that this disgraceful attempt to prevent the youth of the country from acquiring the necessary knowledge of any mechanical trade to enable them to become skilled and competent workmen, should forever cease.

Goods on Consignment.



AS A WORD in season we take this opportunity to once more press upon the attention of manufacturers and jobbers of jewelry, the importance of taking some action whereby the practice of consigning goods will be absolutely discontinued; the number of firms addressed is very small, and consequently there is not the slightest doubt but that the desired result can be obtained to the great advantage of one and all if united action can be secured.

Persons to whom goods are consigned take but little interest in disposing of them, and are totally indifferent as to their care and preservation; it is a small matter to them to what extent the articles become shop-worn, damaged and unsalable, as they do not have to sustain even a proportion of the loss, and under such circumstances it cannot be considered in any degree remarkable that so large a percentage of the goods returned to the consignor at the close of the season are practically worthless; it is marvelous, however, that such a "condition of things" can be perpetuated from season to season without occasioning any greater opposition than an occasional protest uttered with less than half-hearted earnestness. We know that consigning costly goods is an undesirable method of doing business, and that those who have indulged the practice have sustained the losses that inevitably ensue from pursuing such a course, but we do not understand why further and continued losses should be invited, when the limited number of firms who are affected have it in their power to crush out the evil by an agreement of the simplest form. Individually, they are desirous of effecting such an agreement—collectively—but unfortunately there is at present no authority for using the latter term; when there is, however, there will be no further need to mention the word consigning, for it will disappear from the vocabulary of the jewelry trade.

Foreign Correspondence.

BIRMINGHAM, England, Sept. 13, 1886.

To the Editor of the Jewelers' Circular:

As "The British Association for the Advancement of Science" has just paid a visit to this town, an exhibition of local manufactures and industries has been held to show our visitors the advance made since their last visit thirty years since when a similar exhibition was held.

I propose in this letter to give you some account of the jewelry exhibited.

It would be difficult to say which exhibit was the best, but certainly that of Messrs. T. & J. Bragg, of Victoria street, "The Royal Jewelers," stands entirely alone in the class of goods exhibited. This firm has made a name for themselves in the manufacture of mayor's chains, having altered their style by the use of coats of arms, etc., until instead of being the meaningless ornaments they were 50 years ago, we now find them almost recording the histories of their respective towns. In this case were 25 of these, all of which were manufactured by this firm and have been lent by the different mayors for exhibition. In addition to this are a large quantity of badges and insignia of office made for various civic and other institutions.

A diamond necklet, pendant and ear rings in this case attracted a

lot of attention, being composed entirely of Oriental stones, very few of which would weigh less than $1\frac{1}{2}$ karats.

The case attracting most attention was that of Messrs. William Spencer & Son, Regent Place. This was one blaze of diamonds, the class of work being of the very best. One bird exhibited being especially noticeable for the size and purity of the stones. Here, also, was to be seen the process of diamond cutting, the machinery for which was worked by electricity.

The largest case of jewelry is that exhibited by "The Associated Jewelers," which is a party of eight manufacturing jewelers who joined together for exhibition purposes.

In this case the exhibition of charms and seals, by Messrs. H. Fitter & Sons, was very creditable, some of the compasses being specially nice.

Messrs. Allen & Martin, of Great Hampton street, exhibited a new line of manufacture for them; this firm has had a good name for colored gold brooches, etc., but here they are exhibited gold watches. Two specialties being a watch for the blind which has no dial, but is a repeater, striking the minutes, and the smallest watch in the exhibition, no larger than a shilling.

Mr. J. Wainwright, of Warston Lane, had some very neat and chaste patterns in brooches and bracelets, a specialty being a colored gold brooch shaped like a large pin, with a letter or monogram on set with pearls.

Mr. W. H. Small, of Pitsford street, showed his usual good display of mourning jewelry, and in addition some very finely made brooches, etc., set with pearls, pink coral, etc., one bracelet being especially handsome.

Although the arrangement of the case of Messrs. G. E. Walton & Co., of 52 Hylton street, was indifferent, some of their goods deserve special notice. This firm's specialty is "West's Patent Solitaire" and "The Biclimax one-part Solitaire." Their exhibit of these contained their usual large assortment of patterns. They had also a large variety of patterns in "crocidolite" brooches, and some great novelties in pearl brooches set in silver gilt, the colors in the pearl under the brilliant electric light being very fine and the patterns most original. Before leaving this case I must mention the gold and silver chains, the patterns being specially good.

In silverware, John Thomason, of 1 and 3 Spencer street, was certainly to the front, his exhibition of scent bottles being unique. I specially noticed a set of dinner castors, consisting of 4 salts, 1 mustard and 2 peppers, very beautifully worked up with parcel gilding and oxidizing.

Mr. J. T. Derry, of Hockley street, showed some specialties in match boxes, cigar and luncheon cases. Some painted enamels of landscapes and flowers being specially pretty.

Messrs. Elkington & Co., of Newhall street, certainly carried the palm for E. P. goods. Their shields for competitions and epergnes being very fine. They had also a good exhibit of bronze statuary.

Some very pretty E. P. goods were shown by Messrs. Wilkinson & Sons, Great Hampton street.

The effects produced by parcel gilding and oxidizing were very beautiful, and we could not help noticing some of the painted enamels.

SOLITAIRE.

Diamonds in Kentucky.



THE late meeting of the British Association a paper of special interest to Americans was read by Professor H. Carvell Lewis, before the geological section. It was entitled, "A diamond bearing peridotite, and the genesis of the diamond." The professor drew his arguments from an investigation of the Kimberley diamond field in South Africa. When diamonds were first found there, in 1867, the so-called "dry diggings" were believed to be alluvial deposits, but it has now been ascertained that they are

really volcanic pipes or tubes, of a highly interesting character. In 1870 and 1871 further fields were discovered at Kimberley, and all had the same geological structure, each being a separate pipe, and all rich in diamonds. It was soon discovered that the pipes went down vertically to an unknown depth, penetrating the surrounding strata. The diamond-bearing matter, when first penetrated, was a soft, yellowish, friable substance, readily crumbling when exposed. At a depth of about one hundred feet it became darker and harder, and finally acquired a slate-blue color, varying in places to a dark green.

Recent excavations have showed that the mines are surrounded by much carbonaceous black shale. These shales "were very combustible and carbonaceous, and extended at least forty miles away from Kimberley, underlying the whole district." The question put by Professor Lewis was whether the presence of these carbonaceous shales did not explain the genesis of the diamond, a problem hitherto unsolved. He called attention to the fact that the diamonds were most abundant where the pipe was surrounded by shale. Earlier speculations concerning the origin of the diamond had, he said, given way to the theory that the diamond, belonged to and formed a part of the matrix in which they were found, and that that matrix was in some way of volcanic origin, either in the form of mud, or ashes or lava. The new hypothesis assumes that the diamonds were formed in the volcanic pipes where they are found by the action of chemical processes set in motion by volcanic force. All exploration tends to confirm the belief that the deeper parts of the pipes and where presumably the chemical action was greatest during the formative period, contain the richest deposits, and it is further supposed that the pipes descend to very great depths, and that originally they communicated directly with the fused and plastic mass underlying the crust of the earth.

All this is interesting, for, as the president of the section, Professor Bonney, observed at the conclusion of the reading, "it seems as if Professor Carvell Lewis has at last arrived at the true theory of the genesis of the diamond." But the most interesting statement made by Professor Lewis remains to be mentioned. It is to the effect that the only place in the world known to geologists where the same peculiar geologic phenomena occur as are found at Kimberley is in Kentucky. There the conditions so closely resemble those of the South African diamond fields as to justify the professor's confident prediction that diamonds, if sought for, will also be found in the American State. The importance of this prediction is perhaps considerable. It is certain that there are carboniferous beds in Kentucky, though the existence of the volcanic pipes filled with the peridotite which Professor Carvell Lewis holds to be the matrix of the diamond has not been generally known, or if known to geologists has been regarded as possessing no particular significance. No doubt the professor's bold prediction will at once stimulate research in the region indicated, and American geologists may expect before long to be flooded with demands for such information as will enable speculative capitalists and adventurers to put the new theory to the test. The actual discovery of diamonds in Kentucky would be an event of great importance, and the serious suggestion of such a source of wealth by a prominent man of science must attract general attention and insure prompt exploration.—*N. Y. Tribune.*

Watch Dials.



THE DIAL of a watch, though of a material rather inconvenient to handle, is not much open to improvements. The liability to injury of the enamel has led to many endeavors to replace it by some more appropriate material. But the principal considerations of a good dial, distinctness, has never been attained in such perfection as with the enameled ones. A perfectly white surface, with deep black figures on it, cannot be surpassed for this purpose. Silver dials, which were intended to supplant enamel,

have nearly the same whiteness, when new, but they are very liable to get dark from atmospheric influences or careless handling. Gold dials have also been tried, but they are much less distinct, and especially a gold dial with gold figures and gold hands, may be considered a nuisance, as in any place, where there is not broad daylight, and to any person who is not endowed with a very sharp sight, it is impossible to derive any benefit from a watch fitted out in that way.

For these reasons, the enameled dial, in spite of its fragility and additional thickness, is and will be kept in use by all those who do not leave out of sight its principal purpose; but it cannot be denied that the invention of a metallic or other appropriate material, possessed of the indispensable qualities, would indeed prove a great progress in practical horology. Here is ample room for useful inventions. There was a period when in England and elsewhere dials were preferred of a yellowish or grayish tint. These are, of course, not so fit for the purpose as those of pure white enamel. In the same way the slightly frosted surface of the English dials is thought a great improvement, as it is said to allow of looking at the watch in any direction without being disturbed by the reflection of the dial surface. This is a strange mistake, for if the dial of a watch does not reflect when held in an awkward direction, the glass over it will certainly do so. Besides it is so very easy to look at a watch without any danger of annoying reflex.

The fastening of the dial in its position is effected by pins or screws. It is not advisable to fix the dial with two small screws and holes drilled through it, because the dial is very much exposed to injury by the slightest sideward pressure when shutting the case, the holes being so very near the edge of the dial. This method of fastening dials was formerly preferred by the best French and Swiss makers, and many a fine dial has been spoiled by it.

A dial fastened in this way requires some care of the repairer when putting it on. He ought to screw both the screws gently down, but afterward to release each of them by about one-quarter of a turn, so as to ease the dial in its position.

Another way of fastening the dial is with pillars, or feet and pins. It is quite efficient, and involves no danger; therefore it has been much in favor in English watches, and if the movement can be got at, there is nothing to be said against it. But in the movements of the present period, the greater part of which do not open with a joint, the fastening with pins would be rather troublesome, because, for taking off the dial, it would be necessary to take the movement out of the case.

In all movements cased in this way, the dial pillars ought to be held by key screws, which allow taking off the dial without removing the movement.

A very good method of fastening the dial is to set it in a thin rim of silver or gold, and adjust this rim nicely on the outer edge of the pillar plate. Then, of course, the dial requires no feet, and all the difficulties resulting of collision of these feet with the parts under the dial of complicated watches are done away with.

The hands, in order to be distinctly seen, ought to be of a dark color, and the generally adopted blue steel is far preferable to gold for this purpose, and the figures and hands ought to be a little more substantial than the present taste prescribes for them. The most convenient shape for the purpose is the spade pattern; the Breguet and the Fleur-de-lis hands not being so easily distinguished.

The circle of seconds ought to have every fifth degree visibly marked by a longer and stronger stroke, in order to facilitate the reading of seconds.

Formerly, all the dials had flat seconds, but since about thirty years it has been quite common to have sunk seconds, even for inferior watches. There is some advantage in that, especially in flat watches, where it affords accommodation for the seconds hand, but at the same time it weakens the dial considerably. This may be the reason why some makers have the sunk part much smaller, and the seconds painted on the main dial, the lines extending inward to the edge of the sink. The seconds hand is then shorter, and moves in the sink. The dial ought never to be made larger than the pillar plate.—*M. GROSSMANN.*

Foreign Gossip.

THE FRENCH FLEURS-DE-LYS.—Since the expulsion of the French princes, the Legitimists have begun to wear the fleur-de-lys—the old badge of the Bourbons. “Though lost to sight, to mem’ry dear.”

RECOINAGE OF MONEY.—By command of Her Majesty, Queen Victoria, all the English money bearing the heads of previous sovereigns is to be called in, and will be replaced with coin bearing the image of the reigning sovereign.

WATCH IMPORTATION INCREASING.—The exportation of watches and tools from the consular district of Geneva to the United States for the second quarter of 1886, amounts to 425,280 francs; for the corresponding time of 1885 it was only 318,525 francs.

FRENCH IMPORTS.—The value of French imports during the last six months decreased 23,000,000 francs, while the exports increased 42,000,000 francs. The treasury receipts fell off heavily, chiefly in consequence of losses in the revenue from sugar duties.

VALUABLE INFORMATION.—A Paris horological exchange clips and translates from one of our New York contemporaries that Geo. D. Keach, jeweler, is the successor of J. C. Woodleaf, at Abilene, Texas, and that a certain firm composed of three members, located at Laramie, Wyoming, have dissolved partnership. These items must be very interesting to the jewelers and goldsmiths of Paris, France.

PECULIARITY OF ELECTRIC LIGHT.—The apparent remarkable enlargement of the filament of an electric incandescent lamp on becoming white hot is explained by the fact that when some of the nerve ends of the retina of the eye are exerted by light, the excitement extends to some degree to the neighboring nerves. Thus a narrow white hot wire or thread affects, especially from a distance, more nerve fibers of the retina than really receive the light rays, and the sensation is that of a large wire. This is the phenomenon called irradiation.

A SAW WITHOUT TEETH.—A saw capable of cutting a steel rail across in two minutes, is used in the Central Hudson R. R. depot at Greenbush, N. Y., and is run by an engine of 90 horse power, is 38 inches in diameter, and at its circumference $\frac{3}{8}$ inch thick. The saw is made of Bessemer steel, and rotates with surprising velocity. A constant stream of water is passed over it to keep it cool. It cuts about 3,000 rails before it is unfit for further use. The flying steel dust is thrown underneath the saw with such force that it forms a solid block of steel.

THE CROSS OF POPE LEO XIII.—The cross sent by Emperor William to His Holiness, Pope Leo. XIII., by Baron von Schlözer, is, according to the *Moniteur de Rome*, made from solid gold, and ornamented with rubies and diamonds. It is suspended on a beautiful chain and is an eminent work of art. In the letter accompanying it, the German Emperor expresses his entire satisfaction at the ending of the Caroline question, and declares that in memory of this happy occurrence he sends the pectoral to the Holy Father. The letter is couched in terms of the greatest veneration of the person of the Pope. The *Germania* says that the cross is worth about \$2,500.

TIMELY DISCOVERY.—The silver mine, “The Nick of Time,” in New Mexico, was discovered by John Quincy Adams in the following manner: He was carrying a knapsack with powder to some other mine some time ago, and stopped to rest at a certain place, for this purpose taking off his knapsack. Desiring to smoke a pipe he pulled out a magnifying glass to light it, but in some unaccountable manner the concentrated rays of the sun at the same time ignited the knapsack. Adams hastily threw the burning sack containing twelve pounds of powder into a rock crevice, and the explosion succeeding immediately after opened out a rich silver mine, the one-hird 1 t of which he sold a short time ago for \$16,000.

EAST INDIAN MUNIFICENCE.—The Marquise of Salisbury opened a bazaar in London some time ago for the purpose of raising funds for an infants' hospital. Among the purchasers was also the Maharajah of Lahore; he picked out several knick-knacks, then drew out a dirk, quickly cut off the left coat sleeve, heavily embroidered with gold and jewels, and tendered it as payment to the Marquise. Its value is said to be enormous.

TRADE SCHOOLS.—Technical education in Europe is to be stimulated through the efforts of a convention of its friends, to be held in Bordeaux, France, September 20. The convention will consider all plans and schemes, and lay down the foundation for a thorough international organization. Germany is forging to the front as a manufacturing nation, and France feels that she must plunge into the stream of progress or be left.

AMBER.—This was originally the name of ambergris, the product of the whale. It is from the Arabic *anbar*. It afterwards became extended through some confusion to the fossil resin found chiefly on the shores of the Baltic, and now known in English as amber simply. In French, the two appellations are distinguished as *amber gris* (gray) and *amber jaune* (yellow). The Greek name of the resin was *electron*, which has given birth to our term “electricity.” The reference to amber in Ezekial, i., 4, is given in Wyclif's version as *electre*. Spermaceti has been known as white amber.

AN IMPALPABLE COUNTER.—An ingenious method of indicating the oscillations of a free pendulum, and which, indeed, is applicable to other delicate movements which require to be unhampered by extraneous forces, has been devised by M. Marcel Deprez, the well known French electrician. M. d'Abhadie, of the French Academy of Sciences, proposed to utilize a ray of light incident at each oscillation on a selerium cell in circuit with a battery and an electromagnetic counter. M. Deprez has, however, chosen a thermo-electric in place of the photophonic arrangement. The pendulum is furnished with a screen, provided with a window 30 mm. by 40 mm. long, and 3 mm. to 4 mm. wide. A pencil of luminous rays from a petroleum lamp with a flat wick, and concentrated by means of a cylindrical lens traversing the aperture or window at each oscillation, is caused to strike upon a thermo-electric pile having all its junctions echeloned on a length equal to that of the window. At each oscillation an electric current is thus sent through the galvanometer, which is very sensitive on a periodic. This galvanometer works a relay which closes the circuit of an electric counter.

THE HISTORY OF GLASS IN IRELAND.—The old Irish chronicles are far more interesting to study, as far as regards the history of antique glass, than the Scotch. Glass beads of a wondrous beauty and peculiarity of pattern have been found in old Irish graves, and it is very probable that the ancient Irish Celts understood the art of manufacturing and working glass in the very earliest ages. Small pieces of mosaic glass have been found in the centers of the holy cross, and the Duke of Devonshire possesses a bishop's crook ornamented with admirable skill with pieces of glass mosaic, which, it is said, was made for the Bishop of Lismore, who died in the year 1112. A few handsome chalices, at present preserved in the Museum of the Irish Academy, date most probably to the ninth and tenth centuries, at which time the method of decorating, probably by pressing the devices in the still soft glass, was practiced; the hollows created thereby were filled in with metal, glass or smalts of some other color, and the worker understood to produce thereby patterns more beautiful than any to be found in England, France or Germany. From this may be concluded that the Irish learned the art from a nation still older than their own, most probably from the old Egyptians, and the latter conclusion appears to be well founded, because the Irish styles are entirely similar to those of the old Egyptian works of art. An Austrian scientist found in Egypt a written document, the writing of which is of absolutely the same character as the “Ogham,” an old Irish secret style of writing.

Workshop Notes.

TO SEPARATE SILVER FROM COPPER.—Mix sulphuric acid, 1 part; nitric acid, 1 part; water, 1 part. Boil the metal in the mixture until it dissolves; then throw in a little salt, to cause the silver to deposit.

TO RENOVATE BRONZE.—Bronze may be renovated and re-colored by mixing one part of muriatic acid and two parts of water. Free the article from all grease and dust and apply the acid with a cloth. When dry, polish it with sweet oil.

TO PRESERVE PENCIL DRAWINGS.—Pencil drawings may be preserved in the following manner: Soften white wax in rectified spirits of turpentine, and rub this gelatinous mass gently over the drawing. The white wax will form a coating on the paper after the evaporation of the turpentine.

INK STAINS FROM SILVER.—The tops and other portions of silver inkstands frequently become deeply discolored with ink which is difficult to remove with ordinary means. It may, however, be completely eradicated by stirring a little chloride of lime into a paste with water and rubbing it upon the stain.

TO REDUCE CHLORIDE OF SILVER.—One of the best methods for reducing chloride of silver to the metallic state is in use in the mint at Paris; it consists in mixing 5 parts of dry chloride of silver with 1 part of freshly calcined lime, and to melt it. The chloride of lime thus formed melts easily, without rising in, and running over, or adhering to, the crucible, which takes place by almost every other method, and produce a loss of silver.

THE INFLUENCE OF CURB PINS.—If the balance spring is not entirely equi-distant from both the curb pins in a state of repose, or, what is still worse, if it touches one of the pins, it will, when it makes smaller vibrations, be more subject to the influence of these curb pins, and, consequently, its vibrations will become quicker. It will often happen that with a certain extension of the vibrations, it leaves one of the pins, and vibrates free from all impediment, therefore with less power, for a certain time.

TO TEMPER DRILLS.—Select none but the finest and best steel for your drills. In making them never heat the steel higher than a cherry red, and always hammer until nearly cold. Do all your hammering in one way, for if after you have flattened out your piece, you attempt to hammer it back to a square or round, you will ruin it. When your drill is in proper shape, heat it to a cherry red, and thrust it into a piece of resin or into mercury. Some use a solution of cyanuret of potassium and rain water for tempering their drills, but the resin or mercury will give better results.

HOW TO CLEAN SILVER FILIGREE WORK.—Many goldsmiths encounter great difficulties in cleaning silver filigree work. Put the article to be cleaned in a solution of cyanide of potassium. It will come out perfectly white and frosted, as when new. Rinse with water, and dry by shaking in a bag of boxwood sawdust. Another method is to boil for a few seconds in a strong potash lye, take out and rinse in hot water, and allow to dry in hot boxwood sawdust. If the filigree has worn bright, its appearance can be improved by a very slight dip in the cyanide of silver bath of the electro plater; this dulls and whitens it, and gives it a very chaste appearance.

TO IMITATE OLD BRONZE.—The repeated applications to copper or brass of alternate washes of dilute acetic acid and exposure to the fumes of ammonia will give a very antique-looking green bronze; but a quick mode of producing a similar appearance is often desirable. To this end the articles may be immersed in a solution of one part perchloride of iron in two parts of water. The tone assumes darkness with length of immersion. Or the articles may be boiled in a strong solution of nitrate of copper. Or, lastly, they may be immersed in a solution of 2 ozs. of nitrate of iron and 2 ozs. of hyposulphite of soda in one-half pint of water. Washing, drying and burnishing completes the process.

TO CLEAN IVORY ORNAMENTS.—Scrub them well with a new soft tooth brush, some soap and tepid water; then dry the ivory and the brush, dip the latter in alcohol and polish the ivory until it has regained its former polish. If the water has given the ivory a yellowish tint, dry in a heated place. If the ivory has grown yellow with age or careless handling, it can be bleached by placing it under a glass bell with some chloride of lime and muriatic acid in a small vessel, and setting the whole thing in the sunshine. Be careful not to inhale the fumes of the acid as it works on the lime. The bleaching property of the chlorine destroys the yellow coloring matter in the surface of the ivory, and it resumes its original white tint.

TO DRILL A HOLE IN GLASS.—The country watchmaker will be occasionally called on to drill a hole in glass—say, to replace a glass in a pair of eye-glasses. For this purpose let him make a taper hole in a piece of wood nearly the size required, then glue the wood to the glass, and, when dry or settled, fill up the hole with coarse emery powder moistened with water or oil. For a drill use a thin iron tube the size of the hole (although a little less is recommended), a piece of tin plate will do. Use a quick motion with a very slight pressure. The glass should be laid on a level bed while being drilled. This plan has been tested and answers well. Or, get a diamond-pointed graver and spirits of turpentine, and the graver according to the hole.

MAT BRUSHING.—Very excellent results are obtained by running the fine wire matting brush at about 2,500 revolutions per minute, applying rain water or sour beer diluted with water at the place where the brush strikes the work; occasionally hold a piece of sand paper to the brush. Should the points of the brush be too straight let them strike over a piece of wire, but do not hook them too much, as this would prevent matting. Always preserve the brush in a good condition; should the wires become entangled or twist into knots, separate or cut them out. After the work is matted take a soft hair brush and brush it in soap water, then rinse it in warm water charged with a small quantity of spirits of ammonia and caustic potash; immerse it in pure alcohol for a short time and finally dry it in sawdust.

TO PRODUCE A BROWN TONE ON BRASS.—It is found that a superior brown tone may be produced upon brass by the following simple process. The article having been thoroughly cleaned and freed from all traces of grease, then polished, it is dipped for about half a minute in a cold solution of 10 grams of hypomanganate of potash, 50 grams green vitriol, five grams muriatic acid and 1,000 grams of water; thoroughly rinsing and drying in fine soft sawdust follows. If a reddish cast is desired, the article is to be dipped into a second bath, heated to 60° C. (140° F.), of ten grams each of chromic and chloric acids and hypomanganate of potash, with fifty grams blue vitriol or sulphate of copper dissolved in 1 liter (1,000 grams) water—this latter mixture alone producing a light bronze. The subsequent operation of heating in an oven produces, it is said, a very rich tone.

TO CUT GLASS.—The Berzelius pencil, excellent for cutting glass, is composed of the following ingredients: Gum-arabic, 60 parts; gum tragacanth, 23; benzoin, or benjamin, 23; lamp black, 180; water in sufficient quantity. The gum tragacanth is steeped in water for several hours, and the gum-arabic is dissolved in a sufficient quantity of water, while the benzoin is pulverized finely. The three ingredients are then mixed, the lamp black and enough of water added to make a paste of the consistency to be moulded into a pencil shape, which is afterward finished by being rolled between two flat surfaces. The pencil is heated to redness, and applied to the glass, which it cuts with facility; the point of beginning, however, is to be started with a file. With skill, a bottle may be cut into a spiral, which draws out like a spring; this pencil is a very handy tool in the shop of every tradesman.

Trade Gossip.

Joseph Frankel & Son have removed from No. 21 John street to 38 Maiden Lane.

Mr. Henry Oehl will hereafter be connected with the Keystone Standard Watch Co., Lancaster, Pa.

Mr. A. H. Oakley, formerly with H. F. Barrows & Co., will hereafter represent J. W. Richardson & Co.

Hon. Albert E. Morlan, U. S. Consul at Belize, was among the callers at our office during the past month.

The firm of Quinche & Krugler has been dissolved. Mr. Florian Krugler will continue the business at the old stand.

Mr. George Merritt, of the Waterbury Watch Company, and daughters, arrived home from Europe on the *Adriatic* Sept. 30.

Mr. H. Hopper will hereafter represent Mr. L. E. Sadler, manufacturing jeweler of Attleboro, having his office at No. 10 John street.

Mr. J. P. Stevens, Atlanta, Ga., has admitted to partnership his brother, Mr. L. O. Stevens, and the firm will hereafter be J. P. Stevens & Bro.

Mulford & Bonnet invite the attention of buyers to a large and fresh importation of rare Hungarian opals, assorted in all sizes and of wonderful splendor.

Mr. Joseph Fahys recently won, by popular vote, a gold-headed cane which was offered at a church fair at Sag Harbor to the most popular person in the town.

Mr. J. W. McMillian, formerly of Spartansburg, South Carolina, has removed to Gainesville, Georgia, where he succeeds Mr. H. D. Johnson in the jewelry business.

Schlichling & Rendsburg, manufacturers of gold and silver headed canes, have removed their offices and factory to the Everett Building, 25 Ann street, this city.

Simons, Bro. & Co. have purchased the Silverware (solid and plated) manufactory of Vansant Mfg. Co., which they will add to the other branches of their business.

Mr. George A. Reed is comfortably settled in his new quarters at 45 Lispenard street, and invites an inspection of his newly imported French clocks, bronzes and fancy goods.

Watchmaker—What can I do for you, madame? Old lady, (displaying a pendulum of a clock)—This pesky thing won't go, an' I thought I'd bring it around an' have ye fix it.

The firm of Lane, Tiffany & Co., at Sydney, Australia, having been dissolved, Mr. W. H. H. Lane announces that he will continue the business and settle up the affairs of the old firm.

One of the latest novelties is the grip button scarf holder, which is so useful that every gentleman will appreciate its value. It is made by the Grip Manufacturing Company of Newark.

The Rev. Fanshawe Bingham, of Bristol, England, has in his possession a watch made in 1595, and said to be the first watch made in England. It once belonged to Queen Elizabeth. It has only one hand.

Mr. O. Schwencke, 42 Maiden Lane, has just issued a catalogue of over 400 patterns in hair jewelry, which he will send to any one in the trade upon receipt of fifty cents, which amount will be deducted from the first order.

Messrs. C. B. & G. S. Gale having retired from the management of the New York branch of the house of Simpson, Hall, Miller & Co., Mr. G. W. Hull has succeeded them. Mr. Hull has been for many years the western traveler for the firm, but latterly located at the factory. He is well known in the trade, and extends a cordial invitation to his friends to call upon him in his new location, corner of Fourteenth street and University place.

While the extensive store of R. J. F. Roehm & Son, in the new Whitney building, corner Woodward avenue and Grand Circus Park, Detroit, is being fitted up for them, they will be located temporarily at 241 Woodward avenue.

A man who recently went into the store of A. Steinau, Jr., in Cincinnati to look at some goods, became disorderly and succeeded in breaking a show case worth \$50. Mr. Steinau had the man arrested for the malicious destruction of his property.

Mr. L. W. Sweet has been appointed selling agent for the Cheshire Watch Company, and has located at 175 Broadway. Mr. Sweet is well known in the trade, having represented at different times several prominent eastern manufacturers.

The young emperor of China is to have a new and costly throne at Shanghai. Its foundation pedestal is to be made of gold bricks, and the sub-prefect of Soo Chow has sent to Peking 3,000 pieces of solid gold bricks, of the ordinary size of clay bricks, for that purpose.

A. Luthy & Co. are making a fine line of rich diamond jewelry, consisting of lace pins, ear rings, rings, knife-edge bracelets, combination pins, pendants and hair ornaments in new and artistic designs, which promise to meet the ideas of critical buyers for the holiday season.

Mr. G. Willemin, of the Willemin Watch Case Company, was recently thrown from the platform of a car while returning from Coney Island. He received some pretty severe bruises, which laid him up for a few days, but he has reason to be thankful that he escaped with his life.

Mr. E. T. Baker, well and favorably known as a traveling salesman in the trade, has made arrangements by which he will hereafter represent the following firms on the road: Wm. M. Fisher & Co., gold chains; J. B. & S. M. Knowles, silverware, and J. F. Fradley & Co., gold headed canes.

M. Zineman & Bro. are now thoroughly settled in their new quarters at 701 Chestnut street, Philadelphia, and have in stock a full line of spectacles, eye glasses, watch materials, tools, etc. They call particular attention to their Diamanta spectacles and eye glasses, which are made only by this firm.

Mr. Wesley S. Block, who has lately represented the firm of Hahn & Co., of Providence, in this city, has resigned his position for the purpose of engaging in the diamond business with his brother. Mr. Block is well known in the trade, is very popular and is regarded as an expert in diamonds.

A fire that occurred recently in the shop of Hugo, Berry & Co., in the Whiting Manufacturing Company building, at North Attleboro, inflicted slight loss upon Hugo, Berry & Co., Hempel & Co., S. Richardson & Co. and Crandall & Co. The damage by water was greater than the damage by fire.

M. J. Paillard & Co. give notice that they are the sole owners of the patent for an improvement in musical boxes, and under it have the sole right to make or sell the instrument called the "Sublime Harmony." The trade is warned against buying such boxes, whether imported or home-made, except from them.

Mr. George F. Kunz, of Hoboken, is collecting and indexing works relating to gems and precious stones. His bibliography already numbers 2,000 titles, and will treat of the subject in a comprehensive manner, including facts relating to the history, mining, cutting, uses and literature of gems in all languages.

The Syndicate Chamber of Diamond Dealers of Paris, after the report of Mr. C. Friedel, the expert, has decided that this new ruby be known as an *artificial* stone, and that it loses all quality of the denomination as precious stone. This decision having been made, it remained to disengage the responsibility of those who had sold these stones without knowing them to be artificial, and the Committee of the Chamber then *Resolved*, That all dealers who had sold the artificial stone shall reimburse the innocent buyers of them.

Mr. Henry F. Veith, of the firm of Oppenheimer Bros. & Veith, in company with Mr. Henry S. Oppenheimer, the resident Amsterdam buyer of the firm, arrived from Europe by steamer *Ems* September 13th. Mr. Henry S. Oppenheimer will shortly return to Amsterdam, in order to take advantage of any changes in the diamond market.

Mr. Max Freund returned from Europe Sept. 5 in the *Etruria*. Mr. Freund has been abroad for several months arranging to add diamonds to his other lines of goods. He secured a large lot of desirable gems which are now offered to the trade. This firm finds their Rose case very popular in the trade, the orders for them being extremely liberal.

The case of G. Greenzweig, surviving partner of the firm of Nast, Greenzweig & Co., of San Francisco, who claims \$50,000 damages from the Lancaster Watch Co. for breach of contract, was argued before Referee Leaman, at Lancaster, early last month. The case is likely to occupy the attention of the courts for some time before a final decision is reached.

Mr. S. W. Bailey, of Boston, early last month announced to the trade that in consequence of dull trade he had made an assignment to R. W. Thompson for the benefit of his creditors. He was sanguine that his embarrassment would be but temporary, and that an arrangement would be made with his creditors by which he would be able to resume business.

The "Wimbledon Cup," an elegant trophy presented by the riflemen of Great Britain to the American Riflemen's Association to be competed for annually, has just been won for the third time in succession by M. James W. Todd, of 20 Maiden Lane. Many of our readers will recognize the name, Mr. Todd having been an old advertiser in THE CIRCULAR.

Krugler, Kimball & Co. is the name of a new firm that is established at Nos. 12 and 14 John street, for the purpose of carrying on a general jewelry business. They will carry full lines of American watches and gold and silver cases in great variety. The members of the firm have had an extensive experience in the jewelry business and are well qualified to command success.

The Kansas Retail Jewelers' Association was announced to hold its regular annual meeting at Topeka, September 30. It was announced officially that arrangements had been made to have a full line of guild stamped goods exhibited on that occasion by the manufacturers who make them. At the time of going to press we have received no report of the proceedings.

Mr. Isaac N. Miller, of Miller Bros., returned from a business trip to Europe on the *Servia*. This eminent house carries an endless variety of goods for the trade, of their own manufacture, among them diamond goods that are scarcely excelled anywhere. The firm imports its own diamonds, and is noted for the tasteful settings with which it prepares them for the market.

Although crystals of gold occur in nature, they have never been produced artificially. By allowing a solution of the double chloride of gold and sodium to stand, Mr. W. N. Allen has observed that perfect little regular three and six sided tablets of metallic gold are slowly deposited. The crystals were about 0.003 of an inch in diameter, and the upper surface shows a strong reflection.

The Jewelers' Security Alliance is designed to protect the jewelry trade from the depredations of thieves and burglars. It is a most worthy work that is being performed, has been eminently successful and should embrace in its membership every jeweler in the country. The persistent manner in which the Alliance has hunted down criminals who have robbed its members has made a certificate of membership as valuable as a private watchman to prevent robberies. The names of the officers, which appear in an advertisement on another page, is an abundant guarantee that the affairs of the Alliance are administered in a satisfactory and energetic manner.

Mr. Alfred Schofield, of the firm of Schofield, Aston & Co., died at Plainville, Mass., September 15th, after a short illness, in the forty-fourth year of his age. The deceased was born in England, but removed to Plainville some twenty years ago, where he has resided ever since. He was the junior member of the firm, was well known and highly respected in the trade. He leaves a wife and two children.

Among the members of the trade we have noticed in the city recently were: E. J. Smith, Detroit; S. Hyman, Chicago; C. L. Ruth, Montgomery, Ala.; C. L. Byrd, Memphis, Tenn.; C. H. Duhme, Cincinnati; P. Gottlesben, Denver, Col.; L. Sunderlin, Rochester, N. Y.; W. W. Wattles, Pittsburg, Pa.; M. W. Shaw, Galveston, Texas; A. Wittich, Columbus, Ga.; A. C. Titcomb, San Francisco.

The recent suicide of J. D. Jones, of Paterson, was a most lamentable event. A customer had left a watch with him to be repaired, and Mr. Jones had pawned it, presumably while out of his mind. He was about to be arrested for the offence, when he retired to his room and cut his throat. When discovered he was dead, preferring to take his own life than to submit to the disgrace of arrest on a criminal charge.

Among the many curious and beautiful improvements in the art of electroplating, the process is now successfully adapted to wood, and has been applied to handles of all kinds, umbrellas, canes, carving knives, etc. The silver is thrown upon the wood and follows all its peculiarities, so that an ordinary handle is simply garnished in almost ineradicable silver, and the plainest wood thus becomes a thing of rich and rare beauty.

The Julius King Optical Company has recently secured the services of Mr. Apffel, a noted London grinder of pebbles, who will hereafter have charge of the grinding department of their factory at Cleveland. Mr. W. G. King has recently been visiting the New York office and preparing new lines of goods for the fall trade. Mr. King reports trade as excellent, and the demand for pebble spectacles and eye-glasses excellent.

Mr. Gustav Marcus, of the firm of Levison Bros., of San Francisco, has been one of the busiest men in New York for the past six weeks. He has made headquarters with Carter, Sloan & Co., and has inspected the stocks of most of the manufacturers in the city and has been a liberal buyer. Mr. Marcus possesses excellent taste in making selections, and his firm will have a surprise for the denizens of the Pacific coast when the goods get there.

Mr. M. Huffman, of Quincy, Ill., is evidently an enterprising business man, for he prints in the local paper in his place a large advertisement showing the full interior of his very elegant jewelry establishment. It is handsomely equipped with show cases and decorative shelving, on which is displayed a large and desirable stock of goods. This is said to be one of the most elegant jewelry stores in the West, and Mr. Huffman enjoys a large and profitable patronage.

Mr. J. J. Maguire, of Harrisburg, was recently victimized by a well-dressed stranger, who purchased a silver watch and gave a forged check for \$363 in payment, Mr. Maguire paying the difference in cash. He took the trouble to inquire at the bank if the alleged drawer of the check was responsible, and was assured that he was, but he did not go so far as to have the signature identified. Cash on delivery is the best plan to observe with strangers.

The subscription of \$100,000 made by the citizens of Canton, Ohio, as an inducement for the Dueber Watch Case Company to remove its factory from Newport, Ky., to that place, has all been paid in, and work of building the new factory buildings will be entered upon at once. The plans, which provide for a three story factory, having a frontage of about eleven hundred feet, have already been agreed upon, and proposals for material have been advertised. It is expected that much progress will be made on the new building during the present month.

The Plainville Stock Company has achieved an excellent reputation for the character of the goods produced by them, and also for the quality of rolled plate of which they are made. In these days of cheap rolled plate, it is a satisfaction to know that some manufacturers preserve the old standard of quality. We desire to direct attention to their advertisement on another page, which specifies especially the styles of goods manufactured by the company.

Mr. Edward F. Sanford, formerly with Alfred H. Smith & Co., and Ferdinand H. Cook, lately with D. Wilcox & Co., have formed a co-partnership for the purpose of carrying on the business of importing and dealing in diamonds and precious stones. The new firm is located at No. 14 John street. Both gentlemen are well and favorably known in the trade, having been travelers on the road and connected with the sales department of the houses named and others.

A shoemaker in Canada was recently found selling watches at a very low price, and it was at once surmised that he was in some way connected with smugglers. An agent of the customs bought a watch from him and then took him into custody. The shoemaker confessed that he received the watches from a wholesale dealer, and this led to the arrest of the dealer. A clue was thus obtained that it is thought will lead to the discovery of some extensive smuggling operations.

A young man giving the name of A. H. Seaman has succeeded in victimizing one or two country dealers by representing that he owned several patents for jewelers' goods, and needed a little money to aid him in putting the goods on the market. He did not get much, but the trade is warned to be on the lookout for him. He is about thirty years old, has a light moustache, brown eyes and curly hair, while a prominent scar marks his face, extending from the mouth nearly back to the ear.

The trade are cautioned against an unprincipled party who is traveling through the country representing himself as a jobber in American watches. He is selling movements and silver and filled cases at a large discount from the regular jobbing list, but he more than covers this discount by charging a fraudulent overweight on gold cases, and by other means. He obtains more for his goods than they can be purchased for of any regular jobber. He always sells for cash and escapes before the fraud is ascertained.

A recent invention of interest to dealers in diamonds and precious stones is a patent diamond tweezers, with which a stone can be quickly and securely picked up and shown as if mounted. In this manner the stone can be handled freely and examined by a customer without the slightest danger of dropping the stone. The stone is secured by a slight pressure, and released by a simple motion. The same principle is applied to a temporary setting for rings, which adjusts itself to any size stone and will fit any finger.

A Nassau street auctioneer has recently had a sale of a lot of old style plated ware sent over from England, "to introduce the celebrated Sheffield ware in America." Inasmuch as this ware, and some of the styles shown, were introduced in this country thirty or forty years ago and were "knocked out" by the better goods made here, we think our English friends will find themselves badly left on this *fresh* "introduce." We question whether after paying freight, duties and selling expenses there will be anything left for the shippers.

A young man in Trenton recently called on Charles Stakeman, of that city, and desired to look at some watches, saying that his grandfather, who is a well known resident, desired him to select a watch which he proposed to give him. The watch was selected, but Mr. Stakeman insisted upon having a written order from the grandfather before he would deliver the watch. This the young man soon presented and took the watch. It was subsequently discovered that the order was a forgery, but the matter was compromised and the swindler went unpunished.

The new Assyrian pattern of silverware introduced this season by Rogers & Bro. is something unique and elegant. The spoons and forks are artistic and at the same time substantial. They are made by machinery patented by this firm, the spring shank giving elasticity without clumsiness. All the fancy pieces of the Assyrian pattern are made in new and very handsome forms, and cannot fail to please. New and attractive goods for the fall and holiday trade abound in the salesrooms of this house, and buyers are cordially invited to inspect them.

A few of the jewelers of Cincinnati have made a most creditable exhibit at the Exposition, but the trade in general is somewhat shy of it. The probability is that most of them require their goods for their regular business, and do not want to take the chances of losing possible sales. Among those who have made a liberal display are Duhme & Co., whose silverware of their own manufacture attracts especial attention. The American Jewelry Company shows a fine assortment of clocks and watches, while J. C. Wilms, Isbell & Co. and J. Mehmert exhibit clocks, jewelry, etc.

Carter, Sloan & Co. have just introduced a new style of fine gold collar button, and in their advertisement illustrate the process by which a solid piece of gold is drawn out into a handsome collar button, polished on all surfaces, without solder or any other elements of weakness. By this means a more substantial and stronger button is made, and one calculated to give the least annoyance to the wearer. The same principle will be applied to sleeve buttons as soon as the requisite machinery can be made. The collar buttons are now made in three sizes and in ten and fourteen karat gold.

Among other novelties introduced by the Dennison Manufacturing Company is a handsome plush case called a complete game box. It is truthfully designated, for in a very compact space are to be found all the appliances for chess, checkers, dominoes, cribbage, backgammon, poker, bezique, whist, go bang, lotto, progressive euchre, jack straws, playing cards, copy of Hoyle, etc. In short, this handsome box, forming a handsome ornament for a parlor or library table, contains games enough to entertain a large party and keep them all busy. It is just the thing for a present to a friend.

A novelty in the way of a pencil has just been introduced by A. W. Faber, the well known maker of pencils. The novelty consists of a magic pencil encased in what appears to be the stub of a Faber blue pencil. The case is enameled in three colors, blue, to represent the outside, an imitation of pine, indicating where the wood has been cut away to the lead, and black, at the point of the imitation lead. The magic pencil inside this case is made of silver, the whole forming a charm for a watch chain. It is something entirely new, originating in the Paris factory of the Faber Company.

The longest clock pendulum in the world is at Avingnon, France. It is 60 feet long and requires four and a half seconds to swing through an arc of nine and a half feet. The largest tunnel in the world is that of St. Gothard, on the line of railroad between Lucerne and Milan. The summit of the tunnel is 900 feet below the surface at Andermatt, and 6,600 feet beneath the peak of Kastelhorn, of the St. Gothard group. The tunnel is 26½ feet wide, and is 18 feet 10 inches from the floor to the crown of the arched roof. It is 9½ miles long; 1⅝ miles longer than the Mount Cenis tunnel.

Messrs. Lapp & Flershem recently discovered that they were being robbed by their cashier, Philip H. French, in whom they had reposed the utmost confidence. His speculations were small, amounting to but little more than \$100 as far as known, but he is charged with having gambled away a small amount belonging to his wife that was entrusted to him for safe keeping. French was arrested and held to answer. His delinquency was brought about by fast acquaintances, who induced him to gamble, and having lost more money than he could pay from his legitimate income, he resorted to dishonest ways to obtain it. It is stated that the gamblers who won the dishonestly obtained money were compelled to make restitution, so that the firm loses nothing by French's transactions,

We desire to call attention to the illustrated advertisement of B. & W. B. Smith, showing the interior of the retail department of the Gorham Manufacturing Company, corner of Broadway and Nineteenth street. This is one of the most elegantly equipped interiors that the Messrs. Smith have ever decorated, the show cases, counters, etc., being highly ornamental and unique in design and finish. For convenience in displaying rich goods and at the same time placing them within the reach of the salesmen, these show cases are unequalled, while at the same time they are highly artistic.

We note an increased interest among the leading houses of the trade in art pottery and fancy goods, many of them carrying full lines of the finer grades of art pottery, such as royal worcester, doulton, crown derby, Hungarian faience, Carlsbad ivory ware, bisque figures, after dinner coffees and plates in satin lined cases and other attractive goods of this kind, which not only pay a good profit, but are each year more and more sought after for wedding, birthday and holiday presents. Bawo & Dotter, 30 and 32 Barclay street, are among the largest importers of goods of this class, and we call attention to their advertisement on another page.

Fairchild & Co., the well-known manufacturers of gold pens, pencils, charms, etc., call attention to their "Unique" fountain pen, which they confidently recommend to all persons having much writing to do. They have been well tested by business men, who have found them entirely satisfactory and great savers of time and annoyance in writing. One filling with ink will last several days, and the pen is always ready for use, there being no waste of time in dipping for ink, nor danger of getting one's fingers covered with ink. Fairchild & Co. keep a large assortment of pens in every variety, besides a large full line of other desirable goods, both useful and ornamental.

Swindlers of all kinds seem to select the jewelry trade as a bright and shining target for their operations. Recently several petty thieves have been robbing the jewelers of Pennsylvania, by the common method of desiring to look at goods and stealing some article while doing so. Usually these thieves are respectable and venerable appearing men who would not excite suspicion, but who give the retailer cause to remember them. If such robberies are to be continued, it may become necessary for the dealer to place his goods and a loaded revolver in front of every stranger who asks to see his stock, the revolver being an intimation that the dealer does not propose to be robbed with impunity.

A very elaborate and attractive assortment of glass, porcelain and bronzes suitable for the jewelry trade is now on exhibition in the showrooms of Messrs. L. Straus & Sons, Nos. 42, 44, 46 and 48 Warren street. An exquisite collection of English and Bohemian, satin and mother-of-pearl glass, in which one sees the delicate colors of the rainbow, blended with deeper and fuller tints, arrests the eye of the beholder on entering the stores. The New York & Rudolstadt Pottery Co., of which Messrs. L. Straus & Sons are the sole agents, exhibit several novelties, such as "gobelin" (in style resembling the French tapestry), and the "natural ivory" (perfectly imitating carving in ivory). This house has also a large assortment of chinaware, bronzes, clocks, etc.

Speaking of the ruby mines in Burmah, *Blackwood's Magazine* says: "The principal diggings are about seventy miles to the north-east of Mandalay, and cover an area of a hundred square miles. Square pits are dug in the ground until the gravel bed is reached in which the gems occur, and from which they are extracted by a rough-and-ready mode of washing. The rubies are generally smaller and commonly disfigured by flaws. The sapphires found are for the most part larger than the rubies, and more perfect. The annual value of stones of all kinds taken from these mines is from £12,500 to £15,000. It is possible that the ignorance of miners is mainly accountable for the small returns, and that by the aid of European skill and machinery their yield might be vastly increased; but judging from the actual condition of the workings, their practical value falls far short of the expectations formed about it on the Paris Bourse."

The golden rose presented by the Pope to Queen Christina of Spain, as the reward of her virtues, is a beautiful work of art. It consists of a pure gold branch bearing nine full-blown roses, a number of buds and some hundred exquisitely chased leaves, while the center rose is made longer than the others to contain the musk and balm of Peru, placed there ceremonially by the Pope. The rose branch stands in a silver-gilt vase of the sixteenth century, ornamented with a figure of St. Christina and an inscription recording the gift. Two tiny angels form the handles.

It is always pleasant to receive words of commendation and to know that services rendered are appreciated. A subscriber in Nova Scotia, forwarding his renewal, says: "THE CIRCULAR is so useful a publication that I cannot afford to do without it. I missed the July number and beg you to send me a copy of it so I can keep my file complete." Another subscriber says: "Do not let my subscription expire, but send me notice in advance. I would not be without THE CIRCULAR for double its cost." Still another says: "THE CIRCULAR is the best trade paper I ever saw; its volumes constitute a perfect library for working jewelers, and is the best text book that can be placed in the hands of young men learning the trade. It gives me pleasure to renew my subscription, for I do not wish to miss a single number."

One evening recently George Short, alias Hall, a young colored man, entered the jewelry store No. 86 Park Row, New York, while the proprietor, Daniel Kraus, was looking through his stock, and ran off with a diamond ring and a watch. The next morning Short disguised himself by wearing green spectacles and made a similar attempt at No. 83 Park Row. The proprietor of that store was too smart for him, however, and he left without any plunder. On leaving he was recognized by Mr. Kraus, and before he had reached the Brooklyn Bridge an officer put his hand on his shoulder. Simultaneously the colored man put his finger in his mouth and swallowed the diamond ring which he wore. The stolen watch was found in his pocket. At the Tombs police court the police told Justice Murray that fourteen other storekeepers were ready to make charges against Short, and he was remanded to allow of their appearance.

Mr. O. E. Hausburg, of No. 71 Nassau street, who is the sole agent in this country for the Standard Watchman's Clock, has just received a United States patent for an improved dial. This dial has a composition of paste on the back, and when this is pasted in the record book that goes with each clock, the paste dissolves and strikes through the perforations made by the different station keys, thus bringing out the whole record of the watchman clearly and distinctly. The standard has won twenty prizes in different competitive exhibitions in different parts of the world, and the manufacturers are continually making improvements in order to maintain its superiority. These improvements are all protected by patents, and include devices that effectually prevent the watchman from tampering with the record. The Standard is made of interchangeable parts, so that if any portion is injured in any way through carelessness it can be replaced without delay.

A writer in *Town Topics* says that a deposit of precious stones of the rare kind known as "golden beryl" has recently been found in the Berkshire Hills. Specimens of this gem are occasionally met with in the hands of collectors, but it has never before been found in sufficient quantity to become an article of trade. When cut the stones are of a beautiful golden color, exceedingly hard and of great brilliancy. Mr. Kunz, mineralogist of Tiffany & Co., pronounces them unsurpassed in purity and beauty. Professor Dana, of Yale College, who recently visited the mines, declares it to be a wonderful formation and the crystals the finest ever seen by him. A dealer in Maiden Lane has a quantity of these stones, some of which he has had cut and set. They resemble yellow diamonds in appearance, are nearly as hard and are full of fire. They are classed among the precious stones but their value has not yet been fixed. Until this is done they will not be placed on the market.

The annual meeting of the New York Jewelers' Association was held Tuesday, Sept. 14, when the following officers were elected: George C. White, Jr., President; Alfred H. Smith, Vice-President; Augustus K. Sloan, Treasurer. Executive Committee: C. G. Alford, B. H. Knapp, Frank R. Appleton, F. H. Mulford, J. C. Aikin. Finance Committee: H. C. Hardy, John A. Riley, J. E. Robert, C. G. Lewis, W. C. Spencer. Membership Committee: W. S. Hedges, C. J. Leward, N. H. White, J. A. Lebknecher, F. H. Richardson.

A burglar, giving the name of Walter England, was recently captured at Chambersburg, Pa., and after being sentenced to imprisonment for the crime for which he was arrested, made a confession to a local reporter of a sensational order. Among other things he said that he and a "pal" had visited many of the towns in the vicinity of Chambersburg and had laid out a regular campaign for the winter. This included the robbing of Geo. W. Ludwig's jewelry store in Chambersburg and various others in the neighborhood. They had a dummy safe to place in front of the safe in any store to conceal their movements while working on the real safe, and to deceive any outsider who might otherwise be attracted to their work. His story sounds considerably like the invention of a person seeking notoriety, yet it is just as well to have such persons under lock and key, and the individuals named as selected victims will no doubt feel easier to know that this designing rascal has been retired from active duty for a time.

The Association of Manufacturers and Jobbers in American Cases and Movements has offered a reward of \$500 for information that will lead to the conviction of any recognized jobber of giving, directly or indirectly, any better terms, prices or discounts on American cases than the rates established by the manufacturers. Frequent complaints are made that "some other fellow" is cutting rates, and the association proposes to find out the facts if possible. The probability is that these complaints are wholly unfounded, having their origin in the fears most jobbers entertain that some one else is getting ahead of them. But it is remarkable that it is always the "other fellow" that is doing the mischief, and when you look for him, he has "just gone around the corner." He is like the Irishman's flea, when you put your finger on him he isn't there. If any one hereafter complains that some one is cutting prices, he will be asked to furnish the proof and take \$500 for his trouble. It is not at all likely that the association will ever have to pay the reward.

Mr. E. A. Thrall has been exceedingly fortunate in securing a large supply of very choice opals at a time when opals are becoming fashionable again. It is stated that Queen Victoria was always a great lover of fine opals, and has recently taken to making presents of these stones in great numbers to persons whom she desired to remember by a personal gift. So she has had them set in pins, rings, brooches, scarf pins, etc., and indulged her fancy in this direction to a liberal extent. Of course, London jewelers took up the fancy, and opals have become a fashionable stone once more. Mr. Thrall was fortunate enough to secure an invoice of some 2,500 choice stones directly from the South American mines, where the best are found, and among them are many of a kind seldom seen. These are called at the mines "fire stones," being mottled in appearance, having all the shades of brown mingled on the surface, but through all flash those brilliant and varying rays of light that give to the opal all the tints of the rainbow, and make of it one of the most beautiful of the precious stones. Scientists who have seen this collection say that they have never before seen such a collection of these peculiar "fire stones." There are also many of the milky white opals in the collection, each one reflecting the prismatic tints for which the opal is so highly prized, and there are others of different colors, bluish white, pale green, etc., but all having the peculiar characteristics of the opal. Some of these have been set in rings and pins, others surrounding diamonds, but however placed the rainbow hues appear conspicuous. Most of the number held by Mr. Thrall are unset and are designed exclusively for the trade.

We have received the annual report of the Board of Managers of the Yale Observatory for the year ending May 31st. The report of Professor Waldo notes an increase in the number of timepieces received from the makers for rating, from 58 in '85 to 74 in '86. He says: "The experiments in the construction of precision clocks have been continued. There being no very convenient facilities for this work at the observatory building, I have, with your permission, erected a private laboratory at my own expense, with a well built clock room, in the rear of the residence at 459 Prospect street. This laboratory is in working order, and a series of experiments has been completed upon two precision clocks mounted therein, with every consideration for stability of support, and the control of their temperature and atmospheric conditions. The apparatus for temperature regulation is found to be efficient, and the work now in progress is expected to throw some new light on the law of compensation for clocks with detached escapements and mercurial-steel pendulums."

About August 20 several houses in this city received orders for goods outright or to be sent on approval, from Harrison Lockwood, jeweler, Castorland, Lewis Co., N. Y. The orders were made out in a businesslike way upon a printed letter head, showing that the writer was conversant with the goods he proposed to deal in. He was very particular to state he "expected the lowest prices and would remit on receipt." Inasmuch as Castorland is only a post hamlet with a population of not over 100, it appeared as though Mr. Lockwood was about to bejewel all the inhabitants with the surrounding country thrown in. Some of the manufacturers here favored with his orders kindly invited Mr. Lockwood to show up the color of his cash or else give satisfactory references. The Secretary of the New York Jewelers' Association also invited Mr. Lockwood to step to the front and give some information about himself and what he proposed to do with so many goods in so small a town, also asking if he ever had been in business at Westfield, Mass. Getting no reply from Mr. Lockwood, the Secretary addressed the postmaster for information in regard to this new accession to their mercantile interests, and received a reply from the postmaster that Mr. Lockwood left that town in a hurry two or three weeks ago and has not since returned or been heard from. We sincerely trust that none of the trade of New York were so "fresh" as to be caught by any such pure chaff as this apparently turns out to be.

The friends of Mr. Ed. Bissinger, now our Consul General at Beirut, Syria, will not be surprised to learn that he is winning golden opinions from the people to whom he has been accredited by our government, for such was a habit he had in this country, but we are none the less glad to record the fact. An Arabic newspaper gives an account of an entertainment given by Mr. Bissinger on last fifth of July evening, in commemoration of American independence. As the resources of our printing establishment are not equal to reproducing the article in the choice Arabic character in which it is printed, we are obliged to content ourselves with giving a translation of it. It reads as follows: "On last Monday evening the Hon. Mr. Bissinger, U. S. Consul, celebrated a *soirée de plaisir* in honor of the one hundred and tenth anniversary of the independence of the United States, to which he invited the whole American colony in our city. At the hour fixed for the meeting, the guests came *en masse* to the consulate, which was decorated with garlands of flowers and flags, and brilliantly illuminated, and Mr. Bissinger, the respected host, welcomed his guests with much cheerfulness and courtesy. In the evening, refreshments and sweets were served to the invited guests, while the skies were ablaze with the fireworks that rent the air. At the end of the *soirée* the American reunion dissolved, expressing its thanks to the honored representative of the government of its dear country." The French paper printed at Beirut also printed a very complimentary notice of this entertainment, at which were present all the consuls of the different countries located there. And the local officials were also well represented.

A fashion writer in a daily paper says that the fancy for buttons fashioned in odd devices is again revived, and these vary from the simple metallic buttons to styles almost as expensive as jewels. Between these is an unlimited range in mother-o'-pearl, hammered French gold, chased silver, copper, bronze and solid gold devices set with half precious gems, and also showing heads of persons of antiquity in cameo, onyx and vari-colored enamels. "Scotch" buttons are shown made of rich-colored cairngorms, and also of silver, enameled in bright tartan colors. These go well with dresses trimmed with gay plaids.

A short time ago an article appeared in this journal in regard to certain wholesale jewelers in Cincinnati, who had been accused of violating certain rules prescribed by the National Association of American Movement and Case Makers. The parties against whom these charges were made were L. Gutmann, A. G. Schwab & Bro., Strauss & Stern, A. & J. Plaut, and J. S. Voss & Son. After a full investigation by the Board of Directors, the accused were unanimously and honorably acquitted of all charges or unmercantile conduct, as it was clearly shown that the facts were misrepresented, and the charges forwarded by the President of the Cincinnati Association under a misapprehension of the facts, based upon a false statement of the detective in the case. The following letter from President Hellebush to Mr. Schwab, chairman of a committee, in reference to this matter will further explain the situation: "A. G. Schwab, Esq., Chairman. Dear Sir—Having duly considered the point presented in our last committee meeting, I now desire to state that I am perfectly willing, and do hereby endorse the finding of the American Movement and Watch Case Manufacturers' Association in the case of the Cincinnati jobbers which resulted in their acquittal. Respectfully, CLEMENS HELLEBUSH."

The jewelry trade of this city responded promptly for the sufferers by the earthquake in Charleston. The following-named firms contributing to the fund: Randel, Baremore & Billings, Wheeler, Parsons & Hayes, American Waltham Watch Company, Carter, Sloan & Co., Enos Richardson & Co., Oppenheimer Brothers & Veith, J. B. Bowden & Co., Alfred H. Smith & Co., Wm. S. Hedges & Co., E. Ira Richards & Co., D. & M. Bruhl, J. T. Scott & Co., Pforzheimer, Keller & Co., Stern & Stern, Joseph Fahys, Albert Lorsch & Co., Charles Glatz, Max Freund & Co., G. & S. Owen & Co., Louis Strasburger & Co., Saunders, Ives & Co., L. & M. Kahn & Co., C. G. Alford & Co., Stern Brothers & Co., J. Eugene Robert & Co., H. C. Hardy & Co., Champenois & Co., A. Wallach's Nephews, Sussfeld, Lorsch & Co., Hahn & Co., Falkenau, Oppenheimer & Co., D. H. Wickham & Co., Eisenmann Brothers, Mathey Bros. & Mathez, S. Eichberg, Henle Brothers, Adolph Schwob, E. Aug. Neresheimer & Co., William Riker, Keller & Untermeyer, Spencer Optical Manufacturing Company, Isaac A. Alling & Co., Marx & Weis, M. B. Bryant & Co., Cross & Beguelin, Julien Gallet & Co., Henderson & Winter, A. W. Sexton & Son, Smith & Knapp, Roberts & Yerrington, Mulford & Bonnet, Vve. L. B. Citroen & Co., L. Hammel & Co., Henry Zimmern, Downing & Keller, Courvoisier Wilcox Manufacturing Company, John Scheidig & Co., Jacob Strauss, Elbe & Klinkowstein, Rothschild Brothers, Heilbronn & Blank, Cox & Sedgwick, J. B. Laurecot, Leopold Weil & Co., Jacot & Son, LeRoy W. Fairchild Company, Anthony Hessels, Henry Fera, M. Fox & Co., Levy, Dreyfus & Co., W. & S. Blackinton, William H. Ball & Co., William Smith & Co., M. Prager, C. K. Colby, John A. Riley, D. Valentine, J. Wodiska, P. Hartmann, Henry Abbott, John R. Greason & Co., Howard & Cockshaw, T. A. Willson Opt. Company, Stuart & Shepard, Krugler, Kimball & Co., E. Karelsen, Charles Leo Abry, Blancard & Co., N. H. White, Payne, Steck & Co., T. B. Bynner, L. Herzog & Co., Ingomar Goldsmith & Co., Ketcham & McDougall, E. E. & A. W. Kipling, B. Karsch, Gorham Mfg. Co., Peterson & Royce. In addition the jewelers of Chicago, Cleveland, Cincinnati and other cities made liberal contributions.

The earthquake shocks in Charleston did considerable damage in the jewelry trade, but not nearly so much as in some other lines of business, for the reason that a majority of the jewelers occupied rented premises, and while the buildings were injured to a greater or less extent, the loss falls upon their landlords and not on them. Several jewelers who owned dwellings suffered correspondingly with other property owners, and will need assistance to aid them in rebuilding proportionately to the others. It was a dire calamity, from which no class of citizens was exempt. Among the losses in the trade that have been reported are the following named: Carrington, Thomas & Co., damage to real estate, and to plate glass; Joseph Bock, loss on stock of chinaware, bisque, etc., \$500, and on three dwellings, \$4,000; James Allan & Co., on store and stock, \$4,500; S. Thomas Jr., & Co., on store and dwellings, \$1,500; Mr. John McElree, residence, \$1,500; S. Brown, store, \$500; the buildings occupied by J. E. Coleman, C. H. Behre, W. A. Wilson, H. Mabus, E. Rosenthal, and one or two others, were cracked and considerably injured, but their goods were not damaged to any serious extent. Since the shock, Mr. Behre has had a stroke of paralysis, supposed to be the result of the excitement of the occasion. Mr. Eugene Huguelet lost his workshop which was in the rear of his residence. The latter took fire at the time of the earthquake from an adjoining dwelling, where a lamp was overturned. The loss on the workshop and tools is estimated at \$1,500. His wife was ill at the time, and the shock and exposure consequent upon her hasty removal from the burning building resulted in her death two days later. Mr. Huguelet has the sympathy of the entire community, stricken as it is, at his heavy affliction. He and his daughters left for the North immediately after the funeral of the wife and mother.

Last month there was a grand regatta at Cranford, N. J., where quite a number of persons identified with the jewelry trade reside. Among the contestants for aquatic honors was Mr. J. W. J. Pierson, the athletic representative in this city of the Howard Watch and Clock Company. Mr. Pierson had been coached for the occasion, according to report, by Hanlan, the champion oarsman, who devoted several months to the work of instructing his pupil in the art of "catching crabs" gracefully. Not that the catching of crabs is essential in a rowing regatta, but, on the contrary, quite the reverse, but as Mr. Pierson is noted for catching crabs while rowing, his friends and backers thought it best to have him so instructed that he could do it gracefully—hence the course of instruction under Hanlan. His competitor was Mr. Robert Herron, a fruit merchant of this city, whose rowing is said to resemble the Courtney style. The contestants were about equally matched, although the ladies declared that Mr. Pierson had the advantage in good looks. At the appointed signal both men came up to the start in good form, and at the word "go" they were off like an earthquake. Mr. Pierson only caught six crabs on the first quarter, but his competitor was two crabs behind; when they got to windward of the stake boat the breeze increased to a gale, and the spectators were fearful that both boats would go to pieces on a lee shore, but by a display of masterly seamanship this disaster was avoided. At precisely the right moment Mr. Pierson hove over his starboard spinnaker while his rival took two reefs in his maintop jibboom, and thus they were enabled to make good their offing. On the home stretch the race was highly exciting, the wind having turned into a dense fog, through which the valiant oarsmen could be distinctly seen taking observations with a pole to obtain their bearings and working at their oars at intervals. Finally when the fog was fanned away the contestants came up to the goal, Mr. Herron leading by something less than a mile and a half. Both men were considerably blown, but it was conceded that the time made was remarkably good, for them, and it was thought that with another season's practice either of them would be able to do his mile inside of two hours. But Mr. Pierson says he had rather sell a million of dollars worth of watches and clocks a month than pull in another race on anybody's river.



THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silversmiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

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The Number of Business Failures Decreasing.



ONE OF the indications of improving condition in the industrial and business world is found in the decreased number of failures this year as compared with previous years. We find in Bradstreet's some facts and statistics bearing on this point which cannot but interest every thoughtful business man. The number of failures in the United States during the nine months from January 1 to October 1 was 7,582, against 8,433 in the corresponding nine months of 1885, and is 720 less than during the corresponding months of 1884. Taking the average ratio of the nine months' failures to totals for the year, it may be safely assumed that the total failures for the year will exceed 10,500, while the failures of the previous year aggregated 11,116, and in 1883 the total was 11,620. The increased and increasing volume of business of the last quarter of the present year is very likely to reduce the total of estimated failures for the year somewhat, for failures are not so common on an increasing as on a diminishing aggregate of business transactions. The liabilities involved in these 7,582 failures of the present year were \$77,110,644, against \$90,976,358 in the first three-quarters of last year, and \$195,951,000 in 1884. The aggregate indebtedness is less than in any year since 1882, and only 40 per cent. of the aggregate losses of the corresponding nine months of 1884. As against the liabilities of these 7,582 failures there were \$37,397,056 of assets, thus approaching more nearly the total liabilities than in any year since 1882. The percentage of assets to liabilities in the failures of this

year is 48.5, while last year it was 48.2, a very slight improvement only. In this respect, the following table given in Bradstreet's shows the statistics more in detail:

NINE MONTHS' FAILURES.

| | No. Failures. | | Actual Assets | | Liabilities. | |
|-----------------------|---------------|-------|---------------|--------------|--------------|--------------|
| | 1886. | 1885. | 1886. | 1885. | 1886. | 1885. |
| <i>United States.</i> | | | | | | |
| Eastern | 939 | 1,105 | \$5,360,589 | \$4,468,916 | \$13,809,662 | \$11,649,254 |
| Middle | 1,780 | 1,806 | 9,109,257 | 13,740,656 | 20,535,406 | 27,629,417 |
| Southern | 1,308 | 1,613 | 5,960,153 | 8,772,644 | 13,044,386 | 18,871,490 |
| Pacific | 663 | 747 | 2,632,082 | 3,036,999 | 5,161,693 | 5,901,010 |
| Western | 2,485 | 2,914 | 12,395,248 | 12,829,712 | 22,987,254 | 25,249,514 |
| Territories | 190 | 338 | 948,426 | 1,015,873 | 1,593,238 | 1,675,673 |
| Totals | 7,582 | 8,423 | \$37,397,056 | \$43,864,800 | \$77,110,644 | \$90,976,358 |
| Canada & Provinces | 914 | 984 | 4,299,103 | 3,391,167 | 8,325,764 | 7,199,967 |
| New York City | 392 | 258 | 2,566,142 | 5,131,996 | 6,377,223 | 9,112,283 |

THIRD QUARTER'S FAILURES.

| | No. Failures. | | Actual Assets. | | Liabilities. | |
|-----------------------|---------------|-------|----------------|--------------|--------------|--------------|
| | 1886. | 1885. | 1886. | 1885. | 1886. | 1885. |
| <i>United States.</i> | | | | | | |
| Eastern | 272 | 321 | \$1,908,837 | \$1,487,694 | \$4,909,261 | \$3,543,749 |
| Middle | 580 | 539 | 2,678,018 | 3,327,454 | 5,847,645 | 6,916,103 |
| Southern | 284 | 329 | 1,296,730 | 1,387,410 | 2,396,674 | 2,491,360 |
| Pacific | 203 | 258 | 1,416,394 | 972,642 | 2,423,162 | 2,080,517 |
| Western | 732 | 798 | 4,380,761 | 3,391,230 | 7,919,585 | 6,804,487 |
| Territories | 50 | 72 | 206,999 | 342,965 | 372,886 | 569,637 |
| Totals | 2,120 | 2,317 | \$11,887,739 | \$10,909,305 | \$23,869,213 | \$22,405,853 |
| Canada & Provinces | 264 | 246 | 1,125,139 | 802,735 | 2,388,389 | 1,697,801 |
| New York City | 92 | 79 | 746,090 | 881,347 | 1,747,505 | 1,761,821 |

Commercial Travelers and the Railroads.



THE VARIOUS organizations of traveling men have been striving for a number of years to obtain such concessions from the railroads as would be a fair recognition of their contributions to the treasuries of those corporations. As yet, however, they are treated the same as ordinary passengers, who travel but little, and to whom a three days' journey is a great event in their lives. Commercial travelers almost live on the railroads, and are paying fares from one year's end to another, and they ought to have some little advantage in rates over other passengers. It was reported some months since that quite a number of roads had agreed to make certain concessions, in accordance with which a traveler could buy a thousand mile ticket, for instance, that would be good upon any road till exhausted, and that such tickets could be purchased at liberal rates by travelers who were properly vouched for. But there are some roads who seem to have a special prejudice against "drummers," and are not willing to make any concessions to them, and unless these roads joined with the others such a plan could not be made practicable. The travelers' associations do not despair of

ultimate success, but the road to it seems long and beset with difficulties. The jewelry trade has a large interest in this subject, and its members should lose no opportunity of strengthening the hands of those who are so earnestly seeking the best interests of the commercial travelers as a class. It is an expensive matter to keep travelers on the road constantly, and the railroad fares are items that tend to swell the account very largely. If anything can be done to lessen this outlay the jewelry trade would reap a decided benefit. Commercial travelers, one would think, are entitled to be treated with as much consideration by the railroads as a hog drover, who brings a lot of hogs to market once a year. But while the drover will get extremely low rates for his hogs and his own fare thrown in, the commercial traveler, who is a constant patron of the road, has to pay full fare for himself and usually extra charges on his sample trunks, if they chance to weigh more than the regulation allowance. Last year several of the Western roads adopted regulations to the effect that they would not carry travelers' baggage to way stations on through trains, thus forcing them to pay express rates whenever they desired to stop at a way station. As their business lay mainly at way stations, their trunks were half the time in the hands of the express companies, running up large bills for transportation. These are irregularities, to call them by no harsher name, that can only be corrected by united action on the part of all those who are interested, and in this matter the jewelry trade cannot afford to be behind any other. The travelers' associations appeal for the support of the entire commercial community, and they should have it.

The Cash Value of a Life.



IT MAY seem rather a mercenary thing to do to consider a human being as an article of merchandise, and attempt to compute the cash value of a man's life, but it is nevertheless the fact that every human life has a cash value. Perhaps it would not be possible for an individual to realize on an asset of this nature, nor would prudent capitalists regard the pledge of a life as negotiable collateral, yet few men would be willing to surrender their lives even for liberal compensation. But every man's life has an actual money value that can be readily computed. Such valuation is dependent upon circumstances and conditions presenting a wide variation, and may range from millions of dollars to zero. It is to be taken for granted that every healthy, fully developed man has some one dependent upon him, in whole or in part; if he has fulfilled all the duties of his manhood he is married and has done his share towards populating the earth, and has gathered about him from one to a dozen children. These are dependent upon him for the necessaries and comforts of life; he is the bread-winner for them. He has voluntarily, and in accordance with scriptural injunctions, assumed the responsibility of providing for these hungry mouths and absorbent brains, and morally and legally he is bound to fulfil those obligations to the best of his ability. There is no escape from this responsibility except the coward's way, by suicide or abandonment. Fortunately for the community few persons care to shirk this responsibility, but, on the contrary, glory in performing their duty in the highest degree towards these dependent ones. To this end they slave from morning till night, year in and year out, striving to accumulate a fortune that these loved ones may be placed beyond the reach of want. There is nothing in nature more sublime than this sacrifice of self on the part of the head of a family, and the concentration of all his efforts to provide for the comfort and welfare of those he has called into the world. In most cases there is little question but the self-constituted bread-winner will be able to provide properly for his loved ones so long as life and health remain to him. But here is the point precisely where so many fall short in the performance of their duty.

While they are able to work they can do all that is required of them, and may be safely trusted with the responsibilities they have assumed; but suppose death steps in to interfere with their calculations, what then is to become of the dependent ones for whom they have toiled and labored so earnestly?

It is in this connection that every man should ask himself: "What is my life worth?" If you are an old bachelor and have neglected your duties and your privileges for the gratification of your selfish yearnings, your life is not worth much, either to yourself or the community; but if you have a family, your life has an actual cash value to those whom you have made dependent upon you. While you are young and full of hope and vigor, you may be trusted to provide for them comfortably. Every day of your life is of value to them; your labor is to them food, shelter, raiment, comfort, and, possibly, luxury; to your children it is, in addition, food for the brain, love and protection. You are training your family to anticipate such comforts as your income will permit, and the money value of your life to them can be measured by the cost they are to you. Having brought these children into the world, it is your duty to provide for them up to that period when they become self-supporting; that period may extend beyond the limits of your life, but you have no moral right to permit your care for them to terminate with your life. It is your duty to provide for them to the self-supporting period, whether that period is reached before or after your death. It is to enable the heads of families to make precisely this provision for dependent ones that life insurance is urged upon their attention. It is the duty of every man to provide life insurance in the interests of his dependents to an amount that shall represent to them, in the event of his death, the cash value of his life.

Scientists have compiled tables that show the probabilities of mortality in such manner that any one can ascertain how many years of life are before him; or, in other words, what his probabilities of life are. According to the American Tables of Mortality, out of 100,000 healthy persons thirty-five years of age, 18,178 will die during the first year, and the proportionate number of deaths will increase with each year of added age. A person thirty-five years of age, whose physical condition is such that he can pass a medical examination for life insurance, may expect to live about thirty one years. If this person is capable of earning \$1,000 a year, then \$31,000 would about represent the cash value of his life to those who are dependent upon him. And this is the provision he should make for them in order that they may live in the style and manner he has educated them to expect. The greater the degree of expenditure he has led them to expect the greater the amount of life indemnity he should provide for them. Of course, in such calculation he is entitled to deduct such portion of his income as goes to his own support, but if he wants to be liberal he will provide for his family an income fully equal to his earnings.

As life insurance is becoming better understood and its beneficence felt more generally, it is seen that it is as much a matter of necessity as any other provision a prudent man can make for his family. If he owns a house he is very sure to have it insured, although the destruction of dwellings by fire is exceptional; yet how many neglect to provide for the emergency of death, which must come to all, which is inevitable and is ever present among us? A man can afford to take chances regarding the burning of his house, but he cannot regarding death, for that he cannot escape, and unless he has made suitable provision, sorrow and suffering must inevitably follow his taking off. Among the many life insurance plans now before the public, none are more deserving of confidence than those which seek to unite the members of professions, trades or special industries in societies for mutual benefit, and which provide indemnity for the lives of their members. One of the most trustworthy of these is the Jewelers' League, which admits only persons identified with the jewelry business, and guarantees an amount to be paid to the beneficiaries of a deceased member not exceeding \$5,000. Lesser amounts, from \$1,000 to \$5,000, may be secured, and the cost is

proportionate to the amount; but there are few persons, comparatively, who want or should be content with a less amount of life insurance than \$5,000. Every man identified with the jewelry trade should be a member of the League, for the reasons: 1. That he needs to make such provision for his family. 2. That the League is essentially a jewelers' organization, and conduces to that fraternal feeling that should exist among the members of every special line of business. 3. It is controlled wholly by the members. 4. The officers selected by the members are jewelers, identified with the best interests of the trade and the League, who give their services gratuitously, who are zealous in the discharge of the duties entrusted to them, who manage the affairs of the League intelligently and economically. 5. The League is trustworthy and deserving of every confidence, pays every claim in full promptly on presentation, and there is no danger of there being any litigation for beneficiaries to engage in to obtain the money promised. From every standpoint the League is deserving the confidence of the jewelry trade to provide the cash value of a life to the extent permitted by its Constitution and By-Laws.

Speculation and Commercial Honor.



WHEN SO many prominent business men are seeking safe refuge in Canada, while their deceived and plundered victims remain to mourn over their misplaced confidence, the question as to whether or not there is such a thing as commercial honor is one not unnatural for skeptics and scoffers to ask. At present there are sojourning in Canada a very large number of defaulting cashiers, treasurers, presidents of corporations and business men of other and various styles and degrees, whose robberies of trusting victims made their emigration a matter of necessity. All these occupied high positions of trust, were generally highly respected in social circles, and, as a rule, were prominent church members. Their fall inflicts a reproach upon the religious denominations they in part represented, but is no more to be considered a reproach to religion than it is to the business calling in which they were engaged; nor does it change the fact that commercial honor still exists in as high a sense and as great a degree as it did before these gentlemen selected Canada as a place for future residence. These men were neither Christians nor honest men, and, consequently, their disgrace cannot affect the cause of true religion any more than it can destroy that sense of commercial honor that is found among the many thousands engaged in business. Because one man kills another the whole human family is not to be denounced as a race of murderers; because a thief and robber uses the cloak of religion to cover his rascalities the cause of Christ is not to be held responsible for his villainies; because a Baldwin robs the various corporations with which he was identified, or a thieving cashier makes off with the cash of a bank or of a commercial house shall we say that commercial honor has disappeared from the land? By no means—these men are simply exceptions to the rule; they were dishonest by nature, and their dishonesty would have come to the surface whatever might have been their surroundings or opportunities. If they had not had the opportunity to rob a bank or an insurance company they would have been found picking a pocket or robbing a peanut stand. Their moral natures were warped, and consequently, never having had any commercial honor, their detection in their nefarious transactions cannot be construed as any reflection upon the thousands of men engaged in commerce, and whose integrity is above reproach. Rascality among business men is the exception, and the denunciation that follows the guilty ones is proof of the abhorrence with which the majority look upon such transactions. No amount of glossing over will serve to divert these denunciations or to convince the average business man that robbery is ever justifiable, or that there can be any valid excuse for an intelligent man committing a crime. On the contrary, the higher his

intelligence and the more exalted his position, the greater the degree of responsibility is he held to. So far from our Canadian refugees detracting from the standard of commercial honor and business integrity that prevails, they have unwittingly raised that standard by so much as accrues from the fact of their withdrawing from active business, and thus closing their opportunities for further fraudulent transactions.

Any one who labors under the impression that commercial honor is on the decline has but to look at the business transactions as they are made on the various exchanges throughout the country from day to day. Here are purchases and sales made aggregating millions of dollars, all based on the simple word of the parties to the transactions—no contracts or legal formalities are required, but the purchases and transfers are made simply by word of mouth, often at times of great excitement and under heavy pressure. Yet how seldom it is that any misunderstanding arises, or that an appeal has to be made to any authority to determine the responsibility incurred under these merely verbal contracts. As it is on the busy exchanges so it is in the industrial and mercantile avenues of business. The word of the average business man is regarded as being as good as his bond, and it is the pride of the majority of them that this is so; the prospect of gaining some advantage over another would be no temptation to them to break their word.

In almost every instance where there have been defalcations and embezzlements it has been ascertained that these have grown out of unauthorized speculations. The individual begins with his own money, but is drawn on and into the whirlpool till he is induced to use funds that do not belong to him; having once transgressed, he continues doing so in the hope that some lucky turn of fortune's wheel will enable him to make good the amounts he has surreptitiously used. Speculation is the bane of legitimate business, and the desire to accumulate sudden wealth is the rock on which many a reputation is wrecked. The man who is engaged in business has no right to speculate, at least with any funds that belong to or are likely to be required in his business. The training that fits a man to be a successful merchant is very different from that required by the speculator, and the merchant has very little chance in dealing with those whose daily business it is to take great chances and to risk everything upon a single hazard. This is not the way of the successful merchant; his is a more plodding and less venturesome business, but it is more profitable in the end than is that of the speculator. The merchant who is in debt has no moral right to engage in speculation; he has obtained his credit on the strength of his being in legitimate business, and because his creditors had faith in his ability to so manage that business as to be able to repay them the amount of his indebtedness. For him to withdraw any portion of the money belonging to that business and risk it in speculative ventures is an act of bad faith towards his creditors, if not absolutely dishonest. In case of his failure, the loss to his creditors is precisely the same as it would have been had he taken the money and flitted to Canada. While speculation is the bane of legitimate business, and occasionally brings a merchant or manufacturer to grief, the number who indulge in it is comparatively small and does not affect them as a class. As a class, the American merchants have as high a sense of commercial honor as any others in the world, and the manner in which they conduct their business with one another is evidence of this fact. That there is an occasional black sheep in the flock is no more than can be said of the learned professions, not excepting the ministry.

Dissatisfied Workingmen.



HERE HAS recently been considerable dissatisfaction manifested among certain classes of workingmen, in consequence of which large numbers of them have been thrown out of employment. In New York, the plumbers undertook to dictate to the employers as to their employment of apprentices and assistants to journeymen, where-

upon the master plumbers locked out their workmen, and for a number of weeks the latter have been out of work. In one or two building trades the men have also been on strike, mainly on account of the employment of workmen who were not union men. But the largest labor demonstration since early spring occurred in Chicago. When the great labor demonstrations early in the year took place the men employed in the pork packing establishments in Chicago demanded the eight hour plan, and the employers were forced to yield to them at the time, distinctly telling them, however, that it was only an experiment, and if it was found not to be satisfactory they should return to the ten hour system. Results proved that the eight hour rule could not be applied to this industry in Chicago while competing cities were getting ten hours work from their men engaged in the packing business. So the Chicago employers notified their men that from and after the 9th inst., they would employ men only on the ten hour plan. The men refused to make any concession, and went out on strike. The employers had expected this, and their experience last spring also led them to expect violence at the hands of the strikers, and possibly attempts to burn their property. Accordingly they made arrangements with Pinkerton's Detective Bureau, so that when the strikers quit work four hundred special detectives, armed with Spencer rifles, took possession of the packing houses, prepared to protect them at all hazards. This strike throws out of employment between fifteen and twenty thousand men, and should the beef packers join the strikers, a still larger number will be out of work. How long this condition of things will last it is impossible to predict, but the employers are so determined to insist upon ten hours as a day's work that they have raised a large fund to carry on the fight. They say that they will be compelled to remove their works from Chicago if the men are successful. There are plenty of men ready and anxious to take the places of the strikers, if they can be guaranteed against violence, and it is largely to afford them protection that so large a force of detectives is employed. There is also a lock-out in the knit goods manufactories of New England, by which 25,000 men are thrown out of employment. At one of the mills in Amsterdam a boy was promoted, because of his proficiency, from one position to another, and as he was not a member of the Union, although a Knight of Labor, the mill hands demanded his removal. This being refused, the men struck. Then the Knit Goods Manufacturers' Association held a meeting and voted to close all their mills till the men in the Amsterdam mill returned to work. The members are under \$5,000 bonds to obey the order of the association. The mills affected are in Cohoes, Waterford, Hudson, Schenectady, Little Falls, Philmont, Amsterdam and Valatie.

Ten hours have never been regarded as too much for mechanics or laboring men to work out of each twenty-four hours, until the labor agitators who now infest the country stirred up discontent and have succeeded in making many workingmen believe that they are cruelly used. Labor statistics, however, show conclusively that in no other country in the world is labor made so easy or is so highly compensated as in this. The employers, who have the care and responsibility of great industrial enterprises, are the ones that do the most, the hardest and the most trying work in their endeavors to conduct their business, so as to keep their men employed. Few of these employers get off with ten hours a day, and if they do not work and worry fifteen or twenty hours a day they are exceedingly fortunate. It is not long since ten hours would have been considered a moderate day's work for the average workman, and they were often required to work twelve and fifteen. Of late years ten hours has been the accepted rule all over this country, and no single occupation can be expected to get along with less. If there should be a simultaneous movement to this end among all classes of manufacturers, there might be some hope of its being successful, for, if all men were agreed upon the subject, the world would get along with half the amount of work that is now done; so, too, we could get along with less costly food and clothing, and our expenses in every direction might be reduced, but so long as we desire to live well and enjoy the luxuries of life, we have got to work

for them, and the more we expect the more work we have got to do. It is the height of folly for the pork packers of Chicago to expect that their employers can accept eight hours as a day's work and compete successfully with the packers of other cities, who get ten hours work for the same amount of pay. It is unfortunate that these strikes have occurred, for the busy season has commenced, and the public is already timid in reference to labor troubles, owing to the widespread dissatisfaction that wrought so much disaster a few months ago. It will take many years of agitation and a reorganization of all the industrial enterprises before the eight hour system of labor can be generally adopted, and any arbitrary attempt on the part of workmen to force any particular branch of business to conform to it, is placing that business at a decided disadvantage, and is so unjust that it is not likely to be successful.

The Self-Reliance of Charleston.



WHEN THE recent great earthquake disaster occurred at Charleston, rendering hundreds of families temporarily homeless, because of the injury done to their houses, and when consternation had seized upon the entire community, it was natural that a cry for help should go up from that stricken people. Only by the help of their neighbors, promptly and freely given, could further suffering be averted. The response to this call came instantly and generously from every section of the country, and from every class of persons. Everybody could appreciate the needs and the urgency of the situation, and for weeks contributions of food, money, clothing and everything needful poured in upon the sufferers at Charleston. But Charleston was not dead—only badly crippled temporarily. While she appreciated to the fullest all that was done for her in her hour of need, she was too proud and independent in spirit to accept a dollar more than would suffice for her immediate needs. So in three weeks from the time she was so badly stricken she sent out word that no further assistance was required, and begging the people who had dealt so kindly by her to cease their efforts in her behalf. Her wounds were not entirely healed, but generous hands had nursed them so kindly that the completion of the cure might be safely left to her own vigorous constitution. It required a strong effort of self-denial to decline further assistance from hands willing to give, but, her immediate distress having been relieved, Charleston preferred to rely for her upbuilding upon her own unaided efforts to receiving donations she could get along without. So she pours out her thanks to all who had responded to her cry for help, and declines to receive further aid from individuals. This manly determination will heighten the good opinion of all men regarding her independent and self-reliant citizens, and every one will wish her success in the future to an extent that shall speedily obliterate all trace of the great disaster that overtook her.

The Introduction of Machinery a Benefit to Labor.



THERE NEVER was a time when machinery was made to do the work of men to the extent that is done to-day. There never was a time when so many men found remunerative employment or when there was such a demand for hand labor. When watches were first made by machinery the cry went up that the occupation of the watchmaker was gone, and those who had theretofore made watches by hand would have to starve. As a matter of fact, there are a hundred watches worn to-day to one that was formerly used, and the increased demand for watches had made a demand for watchmakers and increased their compensation. The sewing

machine is another illustration of the benefits conferred on the working classes by the introduction of machinery. The sewing machine cheapened the price of sewing somewhat, but it also increased the demand for sewing a thousand fold, and where one person earned a living by sewing previous to the first sewing machine, thousands now support themselves by the use of the machine.

The other day the introduction of a machine for "basting" the hems of certain garments into a factory in New England where clothing was made, was the cause of great complaint and almost of a strike; the reason being that one such machine would do the work of five or six women, who would thus be thrown out of work. This little incident, of itself insignificant, supplies a curious illustration of the tenacity with which ignorant people, in spite of the overwhelming evidence of experience, hold to the notion that machinery is the enemy of the laborer. Referring to this subject the *Textile Record* says: The proof that mechanical invention has helped the laborer far more than it has helped anyone else is of the most conclusive character. We cannot present the whole case here, but let us take two or three facts.

In ancient times a conquering invader of a country always concluded his victory by doing one thing: he swept off a large part of the population, took them home with him and made them slaves. Why? Because he wanted to remove from his own people a part of the burden of toil. History is crammed with accounts of such performances. In fact, the process endured to our own time, for the capture of negroes in Africa and their deportation to this country to be sold as slaves, was simply another form of the old business. The slave trade merely supplied a demand for labor from people who wished to reduce their own labors. Now, observe: The invention and general introduction of the steam engine ended this kind of thing forever, for it gave to man a servant far more tractable, more economical, more energetic, more tireless, than any number of human servants could possibly be. The first effect upon the laborer of this change was to uplift him and give him dignity. Labor is no longer joined with slavery.

This is the century of the steam engine. This same century has witnessed the emancipation of the slaves in this country and of the serfs in Russia. It will not close before the slaves will be freed in Cuba and Brazil. Then there will not be an involuntary bondsman in any civilized land on earth. That majestic fact, of vast importance to the toiling man everywhere, is due solely to the advancement of mechanical invention. And, meantime, the general status of the laborer has been so much advanced that he is now for the first time in the history of the world counted as a great political and social power. The laboring man to-day is on top. That is a practical, even if it be a startling fact.

Note this, also: The laborer in civilized countries now earns more money than he ever before earned, and the things which he requires for his comfort and his pleasure cost less than at any former period since the creation. If workingmen would only read history they would find much to induce them to greater contentment. There was not in the British Islands three hundred years ago a dwelling house that would compare in comfort with any one of the tens of thousands of excellent homes owned in this country to-day by men who earn ten or twelve dollars a week. Such a man has articles of furniture, clothing, books, newspapers, musical instruments, opportunities of cheap conveyances, chances for free education, and hundreds of other blessings which nobody had two centuries ago, which the richest could hardly procure one century ago, and all of which have tended to make laborers more comfortable, happier and healthier, and within easier reach even of wealth. The whole of these advantages have been supplied by machinery. The poor man has them because machines have been invented to do the work which men used to do, and because these machines have capacity for production far beyond the unaided capacity of man.

The truth is, that the displacement of human labor by machinery has always been followed by an increased demand for such labor at

better wages and a decrease of the prices of the articles for which wages are expended. In the entire range of mechanical invention we cannot now recall a single exception to this rule. In view of such facts there is something almost pitiable in the persistence with which working people continue to manifest antagonism to the introduction of labor-saving devices. Such hostility, wherever and whenever it is manifested, involves a confession of unpardonable ignorance and stupidity.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number Five.

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THE AMERICAN WALTHAM WATCH COMPANY.

Messrs. Tracy, Baker & Co., Appleton, Tracy & Co., Waltham Improvement Company, American Watch Company, and the American Waltham Watch Company.



IN 1873 and a few succeeding years the company, like all other kinds of business, again passed through another time of great depression consequent upon the panic of that year. It is not necessary to describe in detail the policy then pursued by them. Suffice it to say it was similar in general character to that adopted in 1858 and 1861, and with the same careful management of affairs which characterized the previous occasions they came through unscathed; not only to gradually assume its former position in the matter of production, but eventually to far exceed it. Perhaps, however, the following detail in brief with reference to the year mentioned will be of interest: The first reduction was in the early part of October, 1873, at which time the company employed 877 operatives. This force was largely reduced during the next three months, but in the spring of 1874 they again began to pursue an aggressive policy and increase the working force. This they continued to do, until at present they employ a force of 2,900 in all departments. Between 1878 and 1883 the entire factory was rebuilt and much enlarged.

In the spring of 1877 the first chronographs were put on the market. The attachments were made and added to the movements under Mr. Lugin's supervision at the New York office of Robbins & Appleton. Mr. Lugin is the patentee, his first patent being dated Oct. 3, 1876. These were followed by split seconds and minutes in 1883, and are soon to be followed by a 5 minute repeater and lady's chronograph, all under Mr. Lugin's patents. All the chronograph watches, except the lady's just referred to, are 14 size, and are made in 3 grades. The company is the only one in this country to make chronograph watches of any description.

During the year 1877 the company changed the 18 size movements somewhat, and designated them as "New Model," the principal changes being in the mainspring barrel and the balance. The general appearance of the movement was slightly changed by these alterations. In 1880 all the 18 size grades were changed to quick train, which has since been used exclusively. The other sizes had all been changed to quick train previous to this. In 1883 Mr. John Logan, the hair spring manufacturer, of Waltham, patented a process for hardening and tempering a Breguet hair spring in form. The company obtained the exclusive right to use it, and it is now put in all of their medium and finer grades. During the year 1885 the company put their new style of stem setting full plate movements on the market. They are usually called pendant set, as the crown pulls out to set which dispenses with the setting lever at the side. This device was designed by Mr. D. H. Church, the master watchmaker of the Waltham Company.

It is impossible here to go into the details of the changes that the company have made from time to time in the matter of stem winding devices, and especially of hand setting mechanism. They are familiar to the older members of the trade.

The reader's attention will now be briefly directed to some of the improvements in and additions made to the productions of the company during the past two decades or little more. Conspicuous among the early improvements was N. P. Stratton's patent mainspring barrel, patented in 1858, and his patent vibrating hair spring stud, both of which were used by the company for some years but have long since been discontinued. Mr. C. W. Fogg's center pinion which he patented in 1865, was adopted by the company to a limited extent during that year. They had previously tried to use D. B. Fitts' patent reversible center pinion with ratchet and click arrangement, but found it was not a desirable device. A suit at once grew out of their using Mr. Fogg's pinion, as the Elgin Watch Company claimed it was an infringement on Burts' patent pinion which they were using. The latter was formerly constructed by a pinion head being driven on the center staff friction tight. But there was considerable difficulty with this arrangement, and a nut to screw on over the pinion head was afterwards used in its place. Mr. Fogg screwed his pinion head directly on the center wheel staff. The infringement seemed plain, but the suit resulted in an amicable settlement, each company agreeing to allow the other to use their patented improvements and inventions without interference. In the years 1866-8 the following may be mentioned as some of the new departures of the company: A large wing had been added to the factory in 1864 to accommodate the growing demands of the company, and movements began now to be produced in nickel, and soon afterwards a stem winding attachment was added. This period also witnessed the introduction to the trade of a full plate movement called the "Home Watch Company, Boston, Mass." It was an effort on the part of the company to produce a cheaper watch than had been made by them heretofore. This proved a great success and its sale became very extensive. This movement was made plain jeweled at first, but was afterwards jeweled on the top plate and continued as a standard movement by the company until 1873. Another and much finer grade of full plate movement was added at this time named "Waltham Watch Company." It became one of the most popular movements which the company had ever produced, being full jeweled. Garnet plate jewels were used in this grade of movement from the start, the company having adopted their use in the finer grade of full plate movements a short time previous, for the reason that they gave the movements a finer appearance than the large aqua marine jewels which they had been using. The patent center pinion was also adopted in all grades of movements during the years 1866-7. The early part of 1868 the use of mainspring hooks fitted to the end of the spring and familiarly known to the trade as "T" ends, was generally adopted, but they had been in use in the Nashua department from the summer previous. The use of the dust band on full plate movements was also commenced about this time, and later in the year 1868 several of the full plate grades were altered to "sprung over." The American watches had now got so firm a foothold that their makers no longer felt obliged to follow in the old beaten tracks of their English competitors.

When the young company first commenced they could scarcely expect to travel in an unbeaten path, but a different state of affairs had now come to exist. And in as much as the "sprung over" plan is a great advantage in many respects, they made a wise move in making this change. In 1869 the company put "The Crescent Street" movement on the market. It was modeled by Mr. Woerd, of the Nashua department. Although a full plate movement it was quite out of the line of the Company's regular full plate production. It was 18 size but required a special case, as it set from the back, the hand setting square being eccentric to the center. It was made in the Nashua department under Mr. Woerd's special superintendence, and was kept entirely separate from the other 18 size move-

ments. It was the intention of the company to make it distinctively a railroad watch, and as such it met with great favor by the trade and the railroad people.

They also found it an extra care to make one full plate watch alone that was entirely different from all the rest, and in consequence its manufacture was discontinued in 1874. It was made stem wind after 1871. In 1870 the company produced the first 14 size movements which have since become so popular in the list of their productions. They were key wind, plain jeweled with a gold balance. In 1873 many changes and innovations were made in the matter of new grades.

The 10 size lady's key wind movements were discontinued, and a new line of 8 size movements gotten out in both key and stem wind, bearing the names of "American Watch Company," "Riverside" and "Royal," to which others have since been added. The first model of the finer grade of 8 size movement was a three-quarter plate, but with the train much more exposed than is usual in their three-quarter movements.

1873 the company commenced to make all grades of full plate movements stem wind, as well as key. Some of them, however, had been made stem wind a year or more previous to this, but set with a key on the dial side, like the key winding movements. This plan was also continued on some of the grades after the date above mentioned. The principle upon which the stem winding attachment was constructed was the same as is at present used, viz: A yoke, or rocking bar, although more complicated than in its present form.

An opportunity now presented itself such as never had presented itself before, to show to the public at large all these improvements. We refer to the Centennial Exhibition, where the company made a large exhibit, and the favorable report of the judges, of which the late Prof. James C. Watson was chairman, was made the basis of an award to the company. The movements entered for the competitive trials were the finest grade of 16 size.

It may be said that it was this exhibit by the American Watch Company which called forth the famous speech of Monsieur Edward Favre Perret, member of the International Jury on watches of the Centennial Exhibition at Philadelphia, and one of the Swiss commissioners to the United States. The speech, it will be remembered, was delivered in the amphitheatre of the primary college of La Chaux de Fonds, Tuesday, November 14, 1876, shortly after his return from the United States. It has been so universally circulated that we do not think it necessary to quote from it in this connection, but just here the author must take occasion to say, while this speech was not intended as an advertisement for this or any other company, it has proved to be of vast benefit commercially to the horological industry of America. The public began to see that America was really taking the lead in the matter of producing watches at medium and low prices that would compare favorably in time keeping qualities with those of foreign make that cost a much higher figure, and have, perhaps, a more elaborate and fancy finish on some of the parts.

The company also made a large exhibit of machinery at the Centennial, showing the actual operation of making many parts of a watch.

The writer also wishes to direct attention to the matter of improved machinery in the history of this company. While the Boston Watch Company did much that will live while watches are made, there yet remained much to be desired in the matter of labor-saving machinery. It is impossible to give a description of each; "they must be seen to be appreciated." Conspicuous among them is the Automatic Pinion Cutter, invented by Mr. Ambrose Webster in 1865, and another pinion cutter, constructed on a somewhat different principle, but accomplishing the same result, by Mr. C. V. Woerd, in 1864, who also invented the automatic screw machine ten years after. The latter attracted much attention at the Centennial, and may be called the effort of his life in the mechanical line. In 1876 Mr. Bacon resigned the superintendency, and was then suc-

ceeded by Mr. Woerd. Mr. Webster, who had been assistant superintendent since 1872, also resigned, and was succeeded by Mr. Shirley, who still retains the position. In 1883 Mr. Woerd resigned and was succeeded by Mr. E. C. Fitch, a member of the firm of Messrs. Robbins & Appleton, the New York agents, where Mr. Fitch had been the business manager.

Mr. Fitch, after going to the factory to assume the duties of superintendent, was also elected to the position of assistant treasurer, in order to relieve Mr. Robbins of some of the arduous duties appertaining to the office. Thus far but little has been said with reference to the foremen in the various departments, but it seems fitting that slight mention, at least, should be made of those occupying these positions. The present foreman of the machine shop is Wm. H. Wrenn, who was preceded by Messrs. C. S. Mosely, Ambrose Webster, Geo. Hunter and E. A. Marsh.

The plate room, of which Mr. Leonard Green is now the foreman, was in charge of Mr. P. S. Bartlett for many years before he went to Europe to represent the company there. Martin Thomas, foreman of the 18 size train room, had a number of illustrious predecessors in the persons of Messrs. C. S. Mosely, H. Johnson, J. K. Bigelow, and J. W. Learned, the present superintendent of the E. Howard Company. J. L. Keyser, who makes the balances for all the grades, was preceded by Mr. J. B. Gooding, the inventor of the capsule method of balance making, which was essentially the same as is still in use. John Lynch had always been the foreman of the jewelers room, until his death in September, 1885. His successor is Alfred Warren; the adjusting has been done in turn by Messrs. Chas. W. Fogg, D. S. Marsh, D. D. Palmer and Joseph Bates, the latter of whom is in charge at present. The others in charge are as follows: escapements, H. N. Fisher; flat steel, J. T. Shepherd; jewel making, Wm. R. Wills; hand making, N. P. Mulloy; three-quarter plate room, Alonzo Noble; full plate room, Leonard Green; gilding room, Chas. B. Hicks; manufacture of mainsprings and hair springs and springing of balances, John Logan; screws, Chas. H. Mann; dial making, Chas. Moore; dial painting, Edgar U. Hull; nickle finishing, Chas. Berlin; engraving, Wm. Murray; 18 size finishing room, H. M. Haines; three-quarter plate finishing room, Thomas Gill; general finishing and repairing departments, J. N. Hammond; case rooms, D. O'Hara; carpenter, John C. Sawin, and superintendent of buildings, Chas. J. Olney. As to the production of the company, it gradually increased from the small beginning to the enormous proportion it assumed in 1883, when 1,200 complete watches were turned out every day. The numbering of the two millionth watch was celebrated that year, and the three millionth the present year.

Thus far, in the history of this company, no allusion has been directly made to Messrs. Robbins & Appleton as the selling agents. They acted in this capacity from the time Appleton, Tracy & Co. produced the first watches. If an opinion be allowed, it is that neither the trade nor stockholders know the obligations the company are under to the able managers of their selling agency. Goods may be made in large quantities, but it requires live agents to find customers for them. While Mr. Robbins has long been the able treasurer and business manager of the company, and a member of the firm of Robbins and Appleton, it should be said that Mr. H. A. Robbins and Mr. D. F. Appleton, his partners, also deserve no small amount of credit for the part they have performed in connection with selling the goods and in the management of the gold case factory in New York city. The firm were first located in John street, afterward in Maiden Lane and at 182 Broadway, where they remained until they erected the "Waltham Building" in Bond street in 1871. The special idea they had in view in the erection of this building was large and commodious accommodation for their gold case manufacturing business, a history of which will be given in another connection. The building was destroyed by fire in March, 1877, and the present building which they now occupy was erected immediately afterwards. In order to push the sale of goods more vigorously in the

west, a branch office was opened in Chicago in 1873, and placed under the management of Mr. S. H. Hale.

The New York office is considered the main office, although the Boston office is much nearer the factory. Mr. Robbins has resided in Boston, and had the general management of the Boston office for the past twenty-eight years. The London office, which was at first located at No. 16 Hatton Garden, was opened in 1874, under the management of Mr. N. P. Stratton. About this time Mr. P. S. Bartlett had made a tour of England, as well as of other parts of Europe, for the purpose of introducing the company's productions. He relates many amusing incidents in connection with his travels. The European business with headquarters at London is now in charge of Mr. A. Bedford, who went there to assume the management in 1876. The company occupy what is known as the Waltham building, on Holborn Viaduct, London. The watches made for the English market differ slightly from those made for home trade. A cream-colored dial is largely used instead of white. The movements are also engraved somewhat differently for that trade.

This company, as previously hinted at, has been a parent-plant, more than any of the other American watch companies. The reason for this is not only the fact that several other companies engaged their employees from Waltham to build the machinery and start their plants, but in several instances the conception of the new enterprises originated among the employees at Waltham. These facts, coupled with the fact that the company has spread its influence commercially to nearly all parts of the world where watches are sold, make it plain, even to the casual observer, that their influence on the markets of the world has been greater than that of any other company. They have been, to a certain extent, moulding the destinies of not alone of the horological industry in America, but abroad as well. In saying this the writer sincerely believes he has done injustice to none, but simply given credit where it is due in speaking of the early struggles and continued triumphs of the American Waltham Watch Company. The honors won by the American Waltham Watch Co. at the Philadelphia Exhibition in 1876 were repeated at the International Exhibitions at Paris, 1878, Sydney, 1879, Melbourne, 1880, where gold medals and highest awards were bestowed upon Waltham watches; and lastly, at the International Inventions Exhibition at London, 1885, where the Company exhibited and worked 12 of its automatic machines, earning them the recognition of superiority of European scientists and watch manufacturers, alike, and carrying off the Grand Gold Medal, the highest award.

In writing the history of this company the author has only been able, as it were, to touch on the main points, whereas a volume could be filled with it, and yet leave much unsaid. There is much he would like to have commented upon had space permitted, but this must be left to the future historian of horological affairs in America, while we pass on to the history of the other companies.

(To be Continued.)

The Motive Power of Clocks.



LOCKS NOT propelled by springs are actuated by weights fastened to the end of a cord, which is wound around a barrel. The power of the weight increases or decreases according to the diameter of the barrel. The radius of the barrel is a one-armed lever, but by its union with the barrel wheel it becomes a two-armed. For this reason the power with which the barrel wheel depths into the pinion is proportioned to the drawing power of the weight or its ponderosity, as the length of the radius of the barrel, multiplied with the ponderosity of the weight, to the length of the radius of the barrel wheel.

If, for instance, the ponderosity is 2 kilograms, the radius of the barrel 2 centimeters and the radius of the barrel wheel 6 centimeters,

then the power with which the latter depths into the pinion is $2 \times 2 : 6 = \frac{2}{3}$ kilogram.

In the clock train the power decreases with each wheel that depths into a pinion by so much as the radius of the pinion is contained in the radius of the wheel depth into it. We may also say "diameter" in place of "radius," as the proportion remains the same. When, for instance, the barrel wheel depths with a power of 750 grams into a pinion of 8 millimeters in diameter, and this arbor carries a wheel of 50 millimeters in diameter, then this wheel exerts a force of only 120 grams upon the next pinion. Because $750 \times 8 : 50 = 120$ grams. In this manner the power may be calculated up to the scape wheel.

If, however, the original power were to be retained, it then would become necessary that each wheel should depth into the next, having the same diameter; in this manner, however, the time necessary for the scape wheel to make its required number of revolutions, while the barrel wheel makes one revolution, could be obtained. This power may, indeed, be increased, if the actuation of the wheels upon the pinions be reversed, so that the latter act upon the former. For instance: A weight of 1 kilogram draws on a barrel of 72 millimeters in diameter; a pinion of 16 millimeters in place of the barrel wheel depths into a wheel of 48 millimeters diameter; the arbor of this wheel carries a pinion of a diameter of 8 millimeters. The power with which this last pinion depths into the next wheel is $1 \times 72 : 16 \times 48 : 8 = 26$ kilograms.

With such an arrangement, naturally, it would be possible to lift a heavy body by the expenditure of a little power, but it would go increasingly slower, the lighter the ponderosity would become; because the weight of 1 kilogram would have to sink 679 millimeters to revolve the pinion of 8 millimeters only once. In the case of clocks it does not so much depend upon the loss of time to increase the power, but rather upon the gain of time, even if this cannot be effected in another manner than at the expense of power. Neither is it desirable to wind the clock every few minutes nor yet to make the cord unnecessarily long; and for this reason the train is constructed in such a manner that, as already observed, the scape wheel has to make many revolutions while the barrel wheel rotates only once.

CALCULATION OF THE TIME.

Every timepiece, with regard to the purpose of its wheels, may be divided into three parts. The first part of the wheels, from the barrel wheel to the center wheel, solely conditions the length of time during which a clock can go without being re-wound.

The center wheel, upon the arbor of which sits the canon pinion with the minute hand, must, since the hand has to accomplish its revolution in one hour, also revolve once in an hour. When, therefore, the pinion of the center arbor has 8 leaves and the barrel wheel 144, then the 8 pinion leaves, which makes one revolution per hour, would require the advancing of 8 teeth of the barrel wheel which ($8 : 144$) is equal to the eighteenth part of its circumference. But when the eighteenth part in its advancing consumes 1 hour, then the entire barrel wheel will consume 18 hours to accomplish one revolution. If, now, 10 coils of the weight cord were laid around the barrel, the clock would then run $10 \times 18 = 180$ hours, or $7\frac{1}{2}$ days, before it is run down.

Question.—How long will a clock run with 8 coils of cord around the barrel—the barrel wheel having 144 teeth, the first wheel 84 teeth, with a pinion of 12 leaves, the second wheel 80 teeth, with a pinion of 10 leaves, and the center wheel having a pinion of 8 leaves?

Answer.— $\frac{1}{12} \times \frac{8}{10} \times \frac{8}{8} \times 9 = 9,072$ hours, or, 378 days.

The clock would therefore run 378 days.

As will be seen from above example, the number of wheel teeth are multiplied with each other, and the same thing is done with the number of pinion leaves, after which the product of the former is divided by that of the latter, the result being the number of given

hours of the clock with one coil of the cord. This number multiplied with that of the coils of the cord gives the entire time during which the clock will go until run down.

CALCULATING THE TIME OF OSCILLATION, LENGTH OF PENDULUM, AND NUMBER OF OSCILLATIONS.

The second part of the wheel work, from the center wheel to the escape wheel, is in the number of its teeth controlled by the length of the pendulum and the reverse; the length of the pendulum is controlled by the proportion of the number of wheel teeth and pinion leaves of this second part. For instance, a seconds pendulum is to be used in a clock; the center wheel can then be made with 64 teeth, the third wheel with 60 and a pinion of 8 leaves, the escape wheel with 30 and a pinion of 8. The scape wheel, each tooth of its 30 teeth being dropped by the anchor after two beats (or 1 tooth every 2 seconds), accomplishes its revolution in 60 seconds or 1 minute. The third wheel has meanwhile, as it gears into a pinion with 8 teeth, only progressed ($8 : 60$) the $7\frac{1}{2}$ part of its circumference, and consequently would accomplish its entire revolution only in $7\frac{1}{2}$ minutes. While the third wheel (the pinion of which has also 8 leaves) has made one revolution in $7\frac{1}{2}$ minutes, the center wheel has advanced only by 8 teeth or ($8 : 64$) the one-eighth distance of its circumference, and would therefore consume $8 \times 7\frac{1}{2} = 60$ minutes, until it accomplishes one revolution.

With a proportion like the above, to wit, providing the scape wheel of a seconds pendulum with 30 teeth, a seconds hand can be mounted upon the arbor of the scape wheel, since the wheel makes one revolution in 60 beats of the pendulum. Still, the proportion of the number of teeth can also be changed according to desire; for instance, center wheel, 60 teeth; third wheel, 50 teeth and a 10 leaf pinion; scape wheel, 60 teeth and a 10 leaf pinion; so that in this proportion, when the center wheel has made one revolution, the third wheel has already ($10 : 60$) = 6; the scape wheel, however, at one revolution of the third wheel ($10 : 50$) could have made 5 revolutions; consequently (5×6) = 30 revolutions, while the center wheel has made one; to reduce this to time would be equal to 30 revolutions in one hour. Naturally a seconds pendulum would have to be used for this arrangement, but no seconds hand could be mounted because the scape wheel would accomplish one revolution only in two minutes.

Example.—To find the length of a pendulum when the center wheel has 72 teeth, the third wheel 60 teeth and a 6 leaf pinion, and the scape wheel 30 teeth and a 6 leaf pinion.

Since we know that the lengths of the pendulum are proportioned to each other inversely as the squares of the numbers of oscillation, we calculate first how many oscillations the clock makes per hour, which we ascertain as follows:

The center wheel makes one revolution per hour; the third wheel $6 : 72 = 12$ revolutions; the scape wheel makes for each one revolution of the third wheel $6 : 60 = 10$ revolutions, or with 12 revolutions $10 \times 12 = 120$ in one hour. Each tooth causes two beats, therefore the entire wheel $2 \times 30 = 60$; consequently 120 revolutions cause $60 \times 120 = 7,200$ oscillations.

The entire calculation can be made shorter as follows:

$$72^2 \times \frac{60}{10} \times 60 = 7,200.$$

As is well known, the length of a seconds pendulum is 994.07 millimeters and makes 3,600 oscillations per hour. Consequently is proportioned the square of 3,600 : to the square of 7,200 = $x : 994.07$; reducing this we have the square of 1 to the square of 2 = $x : 994.07$; or $1 \times 1 : 2 \times 2 = x : 994.07$; consequently, $1 : 4 = x : 994.07$, whereby we find that $x = 248.51$ millimeters.

In place of the center wheel, any other wheel may occupy the center of the movement and the seconds hand may be in the center of the dial. For instance, the center wheel has 64 teeth; the first third wheel has 60 teeth with an 8 leaf pinion; the second third wheel, upon the arbor of which the seconds hand is mounted, and which, therefore, has its place in the center, has 60 teeth with an 8

leaf pinion; the scape wheel has 8 teeth with an 8 leaf pinion, and the number of oscillations is:

$$\frac{64}{8} \times \frac{60}{8} \times \frac{60}{8} \times 16 = 7,200.$$

The pendulum, therefore, as its time of oscillation is only one-half that of the seconds pendulum, have $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ the length of the seconds pendulum, or 248.51 millimeters.

The second third wheel, which here is the fourth wheel, makes in one hour $(64 : 8 \times 60 : 8) = 60$ revolutions; therefore, one revolution per minute. The wheel must have 60 teeth in order to divide the revolution more equally into seconds. The wheel progresses one tooth per second.

A table of the pendulum lengths is to be found in every work treating on horology, and therefore need not be reiterated here.

Screw Plates and Taps.



THE LATHES employed in the manufacture of screws, says Mr. Saunier, are of two kinds; those intended for polishing, and, where necessary, modifying the form of screw heads much used by watch examiners and repairers, and those specially designed for cutting the threads, which are mainly in use among mechanics. Before discussing them, however, we will give some account of the screw plates and taps in ordinary use.

Common hand screw plates.—The use of these is much facilitated by providing a seconds plate perforated with holes of such sizes that a spindle which just passes into a hole of any given number will be of the size most convenient for forming a screw in the hole of the same number in the screw plate. For a long time we had made use of two Latard screw plates, so made that a rod which would enter into one hole without play was of the most convenient size for forming a screw in the next smaller hole but one. (Thus the plate perforated with plain holes can be replaced by a second screw plate, or by using the successively larger holes on a single plate as gauges).

In order to form a screw that is clean cut and even with the least possible straining of the metal, the holes in the screw plates should have notches; they should be carefully hardened and well polished on each side of the notch, and this system is now even applied in the case of the smallest jewel screws.

Screw dies.—The ordinary plate in which notches are not cut at the sides squeezes up and strains the metal. This effect is less marked when separate dies are used, and disappears entirely if only a small quantity of metal is removed at a time and the cutting edges of the dies are smooth and in good order. In addition to possessing other advantages, this form of screw plates enables us to obtain at will screws of the same thread and different diameters, or of the same diameter and different threads. The dies must be carefully fitted to the sides that receive them. Dies cannot be employed for cutting very small screws.

Fine threaded screw plates.—At the present day these can always be obtained at the tool shops; but thirty years ago it was not so, and the watchmaker was obliged to make them for himself. The following method was adopted: Take a screw formed with an ordinary plate in which the thread is broad as compared with the hollow. If the screw does not satisfy this condition it must be modified thus: Having ascertained that it runs true on its points, and that it is larger than will be ultimately required, attach a ferrule to the screw and place it between the centers of the lathe. The T-rest must carry a smooth horizontal rod of hardened steel. Rotating the screw with a bow, hold a slitting file in the hollow; the file should fit into this hollow accurately and should be smoothed on its two sides, only cutting with one edge. The bar of hardened steel will determine the depth to which the file is allowed to cut. By this means a screw is obtained that has a thread thick at the bottom. With the graver remove the top of this thread, round off its corners

and harden the screw, filing three facets along its entire length that make it taper. The tap having been thus prepared is employed for cutting a thread in a piece of steel, not too thick, that has been previously annealed, and in which a hole is drilled of the proper size. The thread of this internal screw will be thin and the hollow proportionately broad.

The plate is now hammered cold with care, until the thickness is so far diminished that the thread and hollow are as nearly as possible of equal thickness. Harden it and chamfer the ends of the hole with a conical steel point and oilstone dust. Then clean it and cut a thread on a piece of soft steel which may be formed into a tap. If the operation has been properly conducted this tap will satisfy the prescribed conditions, and, when hardened, it is to be employed as a screw plate; for that first formed must, in consequence of the hammering to which it was subjected, present irregularities in the hole, and can only be used to cut one or two taps cautiously. It is useless for making screws or tapping brass.

To clear a stopped hole in a screw plate.—Drill a hole through the center of the piece of metal that fills up the hole, taking care to maintain it central, and to employ a drill that is sufficiently small to avoid all risk of contact with the screw thread. Pass a broach through this hole, and, after tightening it with a few gentle blows with the hammer, turn it in such a direction that it tends to unscrew the broken screw, which will, in nearly every case, be removed without difficulty by this means.

The Curse of Gold.



AN UNHAPPILY too well-founded superstition prevails in our western mining regions that the discoverer of a more than ordinarily rich gold mining district invariably dies a violent death, or, to use a western phrase, "dies in his boots." The *Denver News* appears to believe in this superstition, and has even gone to the trouble of compiling confirmatory data. It mentions 38 diggings, the discoverers of which have met with an untimely end. Twelve were shot and three were swallowed up by the mines; the rest disappeared in Dakota or New Mexico. Geo. H. Fryer, for whom the Fryer Hill Mines, near Leadville, are named, committed suicide in Denver. Two years before his death he was worth a million dollars, but when his body was found his earthly possessions did not suffice to bury him decently.

"Old Virginy," the discoverer of the Consolidated Virginia Mine, sold his claim for \$25, a pony and a bottle of whiskey. A mule killed him finally at Dayton, Nevada.

A snow slide buried the discoverer of the large Standard Mine in Mono County, California.

Col. Storey, for whom a county in Nevada is named, was killed by the Pyramid Indians.

Thomas Page Comstock committed suicide in the vicinity of Bozeman, Montana. He had conducted a party, the celebrated Big Horn Expedition, into the mountains of the same name, to re-discover the lost Cabin Mine, but, being unsuccessful, he shot himself with a navy revolver.

William Fairweather, who brought to light the hidden treasures of Alder Gulch, perished in consequence of his debauchery.

William Farrel died a still more horrible death in the hospital at San Francisco. Although he had discovered the gold mine of Meadow Lake, in his delirium he saw thousands of deceived miners crowding around his bed and cursing him so that he could not die.

The first owner of the famous Homestake Mine in the Black Hills became a highway robber. He stopped the mail coach one day, and the United States officers concealed within shot him.

John Homer, who found the Homer Silver Mine, spent his last

cent in riotous living, and then shot himself in a gutter in San Francisco.

"Doughnut Bill," "Old Eureka," "Kelse Austin," "Nine Mile Clark" and Geo. Hankinson literally "died in their boots" in bar-room encounters.

Lloyd Magruder was assassinated by the men who carried his treasures from Virginia City to the railroad station.

"Montana Plummer," who had discovered one of the richest mines of the world, and had become sheriff afterward, died on the gallows.

An Electric Wonder From Kentucky.



THE LOUISVILLE *Courier-Journal* reports that Hardin County, Kentucky, has contributed to the scientific world an electric clock, which, it says, surpasses everything of the kind ever invented. It has been placed on display at the Exposition by Mr. C. B. Gifford, of Colesburg, and will doubtless attract a great deal of attention. Unlike previous electrical timekeepers, this clock regulates itself automatically under all variations of temperature, and the pendulum remains the same length under all temperature changes. This requires what is called compensation in metal, and is effected by an ingenious arrangement of iron and brass rolls acting upon a lever, so that the distance between the points of suspension and oscillation of the pendulum remains unaltered by the variations of temperature.

The ordinary compensating pendulum consists of a number of rods, which form a part of itself, thus increasing the surface exposed to atmospheric influences, while in the Colesburg pendulum the compensating portion is fixed, and the vibrating portion consists simply of a pendulum bob and approaches as nearly as possible the form of the theoretical pendulum. The electrical device which keeps it in motion, while ingenious, is exceedingly simple. All the wheels of the escapement are dispensed with, and the pendulum is kept in motion by the successive impulsation of a magnetic armature. The magnet varies in strength according to the condition of the battery; but by a simple arrangement this variation of magnetic force makes no corresponding change in the arc of oscillation, which remains constant under all conditions of the battery.

So delicate is this pendulum that one cell of gravity battery is amply sufficient to run the pendulum and a primary clock, and the pendulum will run any kind of electric clock, either primary or secondary, and the number is unlimited.

Mr. Gifford has been testing this electrical wonder for four or five months, and not even the slightest variation has been detected. Nothing of the kind was found at the Patent Office at Washington, and letters patent were secured without any trouble whatever. Had it been the invention of the Wizard at Menlo Park, it would long ago have attracted public attention, adds our information, but as it is the result of long and laborious experiments of a modest gentleman who thirsted not for public applause, its existence is known to but few persons.

Gold is King.



THE TOWN of Grass Valley has an enduring foundation. It is as the house "founded on a rock," and the rock of our foundation is good gold-bearing quartz. In all our vales and on every hillside are the sure evidences of the wealth deposited beneath our feet. Deep down in Mother Earth the hardy miner has forced his way almost 2,000 feet below daylight; he has followed the golden veins through solid rock and picked and blasted many miles of gal-

leries; he is still going downward and finds still richer rewards for his increased labor. Locked fast in their rocky safes, these rich deposits in our eternal hills are not to be wrested away and scattered in a day; they are safe from drought and flood, and frost and blight and insect pests; no custodian of our deposits can take the treasure box to Canada between two days. But, unchangeable and indestructible, the precious metal beneath our feet waits to be brought forth by the intelligence and industry of man. The gold field in the midst of which Grass Valley sits is of some miles in surface area, is thickly veined with gold-bearing ledges, and the depth is unknown, but it is known that with depth the richness of the mines increases. There is no reasonable doubt that for generations, and very likely for centuries, gold will be mined in Grass Valley. When the last fish shall have been caught from the sea the last gold may be mined from the earth.

And above this treasure box of ours smiles a genial sky, and the earth yields many of its fairest fruits and flowers in abundance.

But the grand fact which gives assurance of enduring prosperity and prominence to the place that can produce gold is to be found in human nature. Everybody loves gold, always has and always will love it—unless the Creator should become tired of the sort of beings that now inhabit the earth and should people it anew with an entirely different kind of man. Gold is the only thing that all mankind delight in honoring and unite in loving—even its bright sister, silver, is slightly spoken of by some. The gold miner need never fear that the ware he gives to the world will ever cease to be in demand. Gold will always be in fashion. The miner, too, can proudly reflect upon the enduring nature of his contribution to the world's wealth. The "golden grain" of the farmer is eaten and its mission ends. The golden metal of the miner is coined and goes ever on and on, giving pleasure, if not blessing, to him who spends it and to him who receives it. In gold coin, labor is concentrated and wealth represented in a form such that the laborer and the capitalist can conveniently preserve or exchange their gains. The gold miner is often a hero, though his deeds of heroism are not so loudly sounded as the hero who wins a battle; and yet the hero miner found and dug the gold which the hero warrior's king or country had to have in order to place its armies and its hero on the battlefield. Truly, gold is king, and the miner holds up his throne.—*Grass Valley Tidings.*

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of September 14, 1886.

- 348,981—Clock, Calendar. A. M. Lane, Meriden, Conn.
- 348,982—Clock, Calendar. A. M. Lane, Meriden, Conn.
- 349,025—Clock, Calendar. F. M. Wright and W. M. Wood, Bristol, Conn., Assignors to Parker & Whipple Co., Meriden, Conn.
- 348,890—Timepieces, Escapement Lever for. A. M. Lane, Meriden, Conn.
- 349,291—Watchmakers, Mainspring Winder for. P. Ziegel, Nashville, Illinois.

Issue of September 21, 1886.

- 349,605—Clocks, Electric Programme. A. J. Reams, Augusta, Kans.
- 349,650—Clocks, Electric Synchronizer for. M. E. Hunter, Brooklyn, N. Y., and W. H. Gerry, Oakland, Cal.
- 349,983—Clocks, Electro Mechanical Synchronizer for. J. H. Gerry, Brooklyn, N. Y.

349,494—Clocks, Pneumatic Mechanical Synchronizer for. J. H. Gerry, Brooklyn, N. Y., and M. E. Hunter, Oakland, Cal.

Issue of September 28, 1886.

349,803—Bracelet. L. Lenau, North Attleboro, Assignor to E. Whitney & Co., Attleboro Falls, Mass.

350,079—Brooch. R. E. Phillips and C. S. Shepard, London, England.

349,878—Clock. T. D. Garcia, Guadalajara, Mexico.

349,879—Clock, Electric. T. D. Garcia, Guadalajara, Mexico.

349,896—Mainsprings, Winding Stop for. C. Morlet, Jersey City, N. J.

349,880—Watch. D. T. Garcia, Guadalajara, Mexico.

350,005—Watchmaker's Eye-Glass. J. R. Lawrence, Highland Park, Ill.

10,770—Watch, Stop. H. A. Lugin, Assignor to himself and P. Nordmann, New York, N. Y. (Reissue.)

Issue of October 5, 1886.

350,431—Clock, Primary Electric. C. A. Hussey, New York, N. Y.

350,433—Clock, Secondary Electric. C. A. Hussey, New York, N. Y.

350,434—Clocks, Case for Secondary Electric. C. A. Hussey, New York.

350,177—Clocks, Electric Winding Device for. W. F. Weiserber, Assignor to Standard Electric Clock Co., New York, N. Y.

350,425—Watch, Stem Winding and Setting. B. Frese, Chicago, Ill.

350,407—Watch, Stem Winding and Setting. A. M. Yeakel, Perkasi, Pa.

that the settings of the jewels are not disturbed, and indeed that enough metal is left round these holes to admit of their being rebushed if necessary.

Invisible and doubtful depthings—These must be tested by touch in the manner well known to every repairer, and the requisite corrections applied after having repolished the pivots, etc., as may be necessary. We would observe that holes a trifle larger are less inconvenient than those which afford too little play, providing the depthings are in good condition.

Length of balance pivots; centering the balance spring.—Remove the end stone from the chariot, and see that the pivot projects enough beyond the pivot hole when the plate is inverted. Then remove the cock and detach it from the balance. Take off the balance spring with its collet from this latter and place it on the cock inverted, so as to see whether the collet is central when the outer coil is midway between the curb pins. Remove the cock end stone and end stone cap, place the top balance pivot in its hole and see that it projects a little beyond the pivot hole.

Place the balance in the figure of 8 calliper to test its truth, and, at the same time, to see that it is sufficiently in poise; it must be remembered, however, that the balance is sometimes put out of poise intentionally, which will be mentioned at some future time.

Play of train wheel pivots.—Allow the train to run down; if it does so noisily or by jerks it may be assumed that some of the depthings are bad, in consequence either of the teeth being badly formed or the holes too large, etc. To test the latter point, cause the wheels to revolve alternately in opposite directions by applying a finger to the barrel or center wheel teeth, at the same time noting the movement of each pivot in turn in its hole; a little practice, comparing several watches together, will soon enable the workman to judge whether the play is correct. The running down of the train will also indicate whether any pivots are bent. Now remove the barrel bar with its several attachments.

Center wheel; bad uprighting.—Remove the third wheel, and, if necessary, test the uprighting of the center wheel by passing a round broach or taper arbor through it, and setting the plate in rotation about this axis, holding a card near the edge while doing so. This will indicate at once whether the axis of the wheel is at right angles to the plate. When a marked deviation is detected or the holes are found to be too large, they must be rebushed and uprighted again. When, however, the error is but slight, the axis may be set vertical by bending the steady pins a little, in doing which proceed as follows:

Set the bar in its place alone, the screw or screws being a little unscrewed, and rest the side of the bar opposite to that toward which it is to be bent against a piece of brass held in the vise, and strike the farther edge of the plate one or two sharp blows with a small wooden mallet. Experience alone can teach the workman to proportion the blow so as to obtain a given amount of deviation, and must enable him to ascertain whether it is desirable or not to pass a broach through the steady pin holes before operating as above explained. Some discretion is essential in practicing the method.

It is important that the center pivots project beyond the holes in the plate and bar. A circular recess is turned round the outer end of each of these holes so as to form reservoirs for oil. Owing to the neglect of these simple precautions, which are so easy to take, many watches, especially those that are thin, come back for repairs with their center pivots in a bad state, because the oil could not be applied in a sufficient quantity and has been drawn away by the canon pinion of the steel shield. If the watch has a seconds hand, ascertain by means of the calliper that its wheel is upright. Finally, examine each jewel to see that it is neither cracked nor rough at the edge of the hole.

The barrel: to take down and repair. The side spring, which must not be too strong, should reach with certainty to the bottom of the spaces between the teeth of the ratchet, and this latter should be held steadily in position by the cap. The barrel may be made straight

On Repairing and Examining Watches.

Continued from Page 257.



IT SHOULD be possible to rotate the balance until the banking pin comes against its stop, without causing the escape wheel to recoil at all or allowing a tooth to catch outside the cylinder behind the small lip. The banking pin sometimes passes too near to the fourth wheel staff. The U-arms should rest as nearly as possible in the middle of the banking slot of the cylinder, that is to say, they should be near as far from the upper as from the under edge of this slot, so that the end shakes may have free play in all positions of the watch.

Ascertain that the balance spring is flat; that it coils and uncoils regularly without constraint; that it does not touch the center wheel, the stud or the curb pin (with its second coil). The rapid examination of the escapement may now be regarded as completed if the watch in hand is merely being cleaned after having previously gone well. But if engaged on a watch that has not gone well previously or if examining a new one, the action of the escapement must be thoroughly tested in the manner customary for each kind of escapement.

Visible depthings.—While the train is in motion through the force of the mainspring or the pressure of a finger against the barrel teeth examine with a glass all the depths that are visible. That of the escapement, for example, can be easily seen through the jewel pivot hole when this is flat, the watch being laid horizontal and a powerful glass used. When the action cannot be seen in this manner with sufficient distinctness, hold the watch up against the light and look through it. Depthings that cannot be clearly seen or about which any doubt exists, must be subsequently verified by touch. If examining a new watch, it may be found necessary to form inclined notches at the edges of the cocks or near the center hole of the plate so as to see the action of the depthings. But it is important

and true on its axis by the methods to be explained in future articles, the arbor having been previously put in order if required. It is a good plan, after making the extensive repairs here spoken of, to again test the barrel and center pinion depth, either by touch or by drilling a hole for observation.

The screw of the female stop (star wheel, Maltese cross, etc.) must not project within the cover nor rub against the dial; it must be reduced if either case presents itself. The action of the stopwork must be well assured, especially when the actual stop occurs; it is a good plan to, as it were, "round up" the star wheel and finger piece with an emery stick, supporting them on arbors. There must be no possibility of friction between the finger and the bottom on the sink.

To test the stopwork.—Take up the winding square of an arbor with the barrel, etc., in position, in a pair of sliding tongs or a Birch's key; hold the tongs between the last three fingers and the palm of the left hand, the first finger and thumb being applied to the circumference of the barrel so as to rotate it, first in one direction and then in the other. During this movement take a pegwood point in the right hand, and try to turn the star wheel *against* the direction in which it would be impelled by the finger.

Order.—To facilitate the work by securing order in taking to pieces and cleaning, preventing the screws from being mixed, it is a good practice to prepare beforehand one or more boards, in which grooves and holes are made in positions to correspond with those of the several pieces on the plate of the watch, and the young beginner should at once learn that in no department of watch repairing does order pay as well as in the taking down. At first he will find an advantage in noting on a slip of paper bearing the number of the watch, the successive operations that have to be done. He will then merely have to strike them out one by one as the work progresses. As he becomes more practical he can dispense with this auxiliary.

CLEANING THE WATCH.

Whatever system of cleaning is adopted, it is essential that it be concluded by passing a pegwood point into each of the holes.

Brilliancy is given to the surfaces of cleaned pieces by passing a carefully kept fine brush over them. A brush that is greasy can only be cleaned by soap and water, and a new brush is prepared for use by passing an inclined cutting edge over the ends of its bristles, so as to taper them off to fine points, and to remove knots due either to hard parts or to bristles becoming united. This preliminary treatment is completed by charging the brush with French chalk, and rubbing it vigorously on a dry crust of bread until the brush can be passed over a gilded surface without scratching it. The bristles are maintained in good condition by the same treatment. Billiard chalk is also very effective for this purpose, and the greater number of cavities there are in the crust the better it will act. Groat bread seems to be preferable to that made from wheat, because the latter contains greasy particles which prevent the brush from being kept thoroughly clean. A burnt bone is an excellent substitute for the crust, and has the advantage of causing the brush to impart a very brilliant appearance to objects to which it is applied.

To clean with a brush.—This method is less used now than formerly, as it can be adopted with safety with the old-fashioned gilding, but it is too severe for the thin galvanic coats that are applied at the present day. It may, however, be resorted to for getting up the surface of polished brass wheels, for example.

Put some French chalk or powdered hartshorn (which can be bought at a chemist's or drug store) in pure alcohol. Shake the mixture and with a fine paint brush coat the object with a small quantity of it, subsequently brushing the surface with a brush that is in very good condition. Polished wheels may be made to present a very brilliant appearance by this means, but their teeth and the leaves of pinions must be afterward carefully cleaned. The French chalk and hartshorn are all the more effective according as they have remained a longer time in the alcohol; doubtless owing to the fact that the hard grains met with in these agents are then more completely dissolved.

Soaping.—It is advisable to use a soap that quickly produces a good lather; and the object is held in the hand and cleaned by rubbing with a soft brush charged with this lather; then immerse first in clean water and subsequently in alcohol, without moving it about in each; it may for a few seconds be left in this latter, and, on being removed, is dried with a fine linen rag or soft muslin. A stroke with a soft brush in good condition will give brilliancy to the surface. As water sometimes dissolves soap very slowly, it is desirable that it be employed warm. When about to soap polished wheels, the surface must be first got up with a buffstick and rouge or by brushing with hartshorn.

(To be Continued.)

Free Hand and Mechanical Drawing.

BY EXPERT.



IN FIXING charcoal drawings shellac is dissolved in alcohol until it is of a pale amber color. A good deal of shellac can be dissolved in alcohol before it seems to thicken much, and this feature is taken advantage of in preparing the so-called "*Fixatif*." This is usually made of white shellac dissolved in wood spirit (*methol*). White shellac is some way injured in preparation, and is not as good as the ordinary shellac. The pale sherry wine color does not injure the appearance of the drawing, as it only seems to warm the tone a little. A very soft camel's hair brush an inch wide is about the best way to apply the solution of shellac, and the solution should appear as thin as water when applied and sink into the paper, and leave scarcely any gloss on the surface. The drawing is laid face down, and the solution painted over the back. Great care in handling charcoal drawings must be exercised to not knock the coal dust off. It is well to put 4 so-called lace tacks, one in each corner, of the frame on which the paper is stretched, as near the edge as is safe, before commencing to draw. These tack heads are to rest the drawing on a table while applying the shellac to the back. After the solution of shellac has dried, the charcoal particles will be found adhering quite firmly, and we can enforce the shadows with the ordinary French drawing crayon or even India ink. An instrument called an "air brush" is very useful in bringing up a charcoal drawing, but they are expensive. The same effect can be obtained with a stiff tooth brush and a comb, used as we have probably all seen done in the so-called "spray work." But the simple charcoal drawing has attractions enough of itself to give it favor if worked by a skillful hand. There is no steel plate engraving which can compare in exquisite softness and beauty to a charcoal drawing from a master hand. We have plenty of so-called studies in imitation of charcoal drawings, but they fail to convey the peculiar beauty of the charcoal drawing itself. It would be well for the pupil to procure such charcoal studies as he fancied, either human figures, landscape or animals, and use them as a guide for handling. I mean by this the manner of doing the work. But as soon as a person with a true artistic taste understands the scope and strength of any particular branch of art he will establish a method of his own. Don't make any attempts at a drawing less in size than 18 by 24 inches, and set your stretched paper on some kind of an easel to work at. Don't attempt to make your work too fine—I mean by this, show too many details; let all this be for an after effort. Stand up to your work. Make first a sketchy outline of your drawing, then rub in your masses of shade, using your charcoal sticks at as low an angle as possible to get wide marks. Now, take a piece of soft spongy chamois skin and rub the shadows, blending them down lower in tone and much softer in effect. You need not fear to destroy any little effect of light, for this can be quickly brought out by using bread crumb. As good a subject for a first effort is a landscape, and a fine specimen for copying the reader can find in the *Art Amateur* for June, 1885, page 5; it is a

copy of R. Swain Gifford's picture, entitled "Near the Coast." This is a very effective picture and also quite easy of execution. There is also a good specimen of a charcoal drawing of a female head in the same number. The paper for the landscape should be about 18x30 inches. A copy of the journal can be procured for 35 cents at the office of publication, 23 Union Square, New York City. This is cheaper than we could purchase a study from any artist's material house. We commence by rubbing in the sky as directed above and blending the harsh strokes of the charcoal with the chamois skin. Most artists use what is called stamps of chamois rolled up into a roll about 3 inches long, and varying from half an inch in thickness to one inch; but a piece consisting of half a skin of the usual size kept for this purpose answers better than the stamp, as we can roll and wrap the loose chamois skin to suit our purpose, making a large roll or a mere point. The effect of the sky should appear too dark at first, but when the middle distance and dark tree top is worked in the sky will look much lighter. In rubbing off the coal with bread crumb, it is well to cut a paper pattern and work through this where sharp effects are desired. New, tough bread should be used where it adheres to the crust. A little practice will soon put the student in the right way. Even in clouds a few undisturbed strokes with the charcoal will give force and character. Don't work on any effort too long; set it to one side and go at something else and then take it up again, and very likely the part that pleased you most will appear abominable. This should not dishearten you; it only tells you how easy it is to be mistaken. Charcoal drawing has the advantage of great rapidity of execution. A fine effort of the size just mentioned can be done by a skillful hand in a few hours. After fixing spirited touches of soft French crayon will give force to a foreground; but our best charcoal artists seldom resort to any auxiliary, relying entirely on the coal for all their effects, and these must be seen to be appreciated. Charcoal drawings are frequently fixed from the face side, the *fixatif* being applied in spray from an atomizer; but applied as above directed is now generally used. In darkening a charcoal drawing by spray of India ink, cut out paper patterns should be used so the darkening is controlled in form. The writer only mentions such auxiliaries so the reader is aware of them; but he would only advise their use on rare occasions. I have been led to speak more at length on charcoal drawing than I intended when I first mentioned this branch of art, but I assure the reader that if he will essay an effort he will never regret. I intended to keep the advance of free hand and mechanical drawing about equal, but have been led to devote more space recently to free hand instruction. I consider drawing an accomplishment which affords one who possesses the ability a great source of enjoyment, not temporarily, but constantly. To this add the advantages which follow to one in the trade who can design elegantly. I have laid great stress on pen drawing, and do not want the reader to think that because I have given so much space recently to charcoal and India ink drawing that I am advising or opening up a new and better way, for this is by no means the case, for I still hold pen and ink drawing for the artisan is *the* method he needs to cultivate. After a very little practice one does need to copy somebody else's drawing; let his practice be the drawing of familiar objects. Few of us but have some place at which we write; let this be our studio for drawing. We see a nice new design in jewelry; take it to our bench or desk and make a drawing of it with a pen. Not content with a mere outline, but shade it, give relief and elegance. It is not necessary to be compelled to make a drawing; do it for the desire to learn and it will soon cease to be a drudgery, but a pleasure. It has been the writer's aim to so simplify the instruction that any apprentice could, by his own application and efforts, master the art of drawing to almost any extent he might desire. By the aid of the simple perspective machine already described, which a person of mechanical turn can make in two hours, any inanimate object, no matter how complicated or irregular in form, can be correctly drawn. Let any person read this series of articles from the first and practice the instructions—practice drawing as there directed

—not one effort, but repeated efforts, and he can no more avoid learning to draw than he can avoid falling if he steps deliberately from a fourth story window. We will in our next discuss free hand memoranda drawing for mechanical purposes.

Gossip of the Month.

THERE is hope that the United States will yet be developed into a prolific field rich with nearly every variety of precious stone. Prospectors are scattered through the land following up every indication, and they have been satisfactorily rewarded in more than one instance. We recently saw a statement made by an eminent geologist to the effect that in Kentucky there abounded precisely the rocky formation that is recognized as the home of the diamond, and he predicted that these precious stones would ultimately be found there in quantities. Geologists have been making some extended investigations in North Carolina, and have reduced their mining for precious stones to a matter of regular business. They have already found various kinds of stones of value, among them rubies, emeralds, etc., and are sanguine of yet more important discoveries. A dealer in Maiden Lane has recently exhibited several specimens of perfectly formed crystals, one piece weighing nearly 200 pounds, which were found in Virginia. Rubies, and at least one pure diamond, have been found in the same locality, and those interested are confident that they will yet come upon diamonds in liberal quantities. Their investigations are being prosecuted with this hope, and they are putting their money into this kind of mining precisely as Californians put their money into gold mining. The large specimens of crystal referred to were found a depth of over ninety feet below the surface. One of these specimens, weighing close on to 60 pounds, is without flaw or blemish, and from it a sphere can be cut fully six inches in diameter. While this country abounds in the precious metals to an extent scarcely equalled by any other country on the face of the globe, there would seem to be no good reason why the precious stones should not be discovered in equal abundance.

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WE NOTED the fact last month that a new stone had recently been discovered in New England and classified as golden beryl. Some of them were exhibited in this city and were greatly admired. They promised to be used somewhat as single stones, but mainly as settings in connection with diamonds, to which they serve as a most excellent foil. But it appears that while at first it was believed that these stones were extremely scarce, the discoverers have since found them in great quantities, and talk about furnishing them by "the ton." They are reported as having said also that they had so much of this material that they proposed that every man, woman and child in the land should have it if they wanted it. The profuseness of it, of course, robs it of all claim to be regarded as a precious stone, and jewelers will relegate the golden beryls to the category of colored glass and imitation gems. This is a pity, for the stone is really a beautiful one, and might be utilized to good advantage if it were not made common. If the discoverers have thus cheapened their prize, they will have no one but themselves to blame if they fail to realize a handsome profit from their discovery. Let diamonds be offered in the market by "the ton" and they would at once lose their charm and their value. To cheapen an article of this kind is to consign it to oblivion.

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AN OLD traveler on the road complains of the manner in which railroad conductors take up the tickets of passengers, leaving them

nothing to show that they have paid their fare through. This is especially the practice with sleeping car conductors or porters, who insist that the passenger shall surrender his ticket when he goes to bed, promising to return it to him in the morning. But conductors and sleeping car porters are liable to make mistakes as well as ordinary human beings, and the practice is liable to result in subjecting a passenger to great inconvenience and possible expense. Our correspondent states that he once saw a passenger put off the train because the conductor would not believe that he had surrendered his ticket when previously called for. A passenger traveling on a through ticket is not compelled to surrender it to the conductor at the beginning of his journey, or until nearing the end, without a receipt of some kind. It used to be the practice for conductors to take up the ticket but to give a check for it, which check was good until another conductor came on duty and required another section of the ticket. But now it is the practice on through trains for the conductor to take up the ticket without giving anything in the way of a receipt. The courts have held that a passenger is not required to surrender his ticket under such conditions. In a case tried in New Hampshire it was shown that John B. Hill purchased a ticket at Dover, a station of the Boston and Maine road, for Exeter. Soon after the train started the conductor demanded his ticket, which he exhibited but refused to surrender. The conductor did not offer him a check or any other sort of a receipt, and, as the passenger had experienced difficulty before when he had surrendered his ticket, he was determined not to be caught again. Finally Hill was forcibly ejected from the car and he had the conductor and his assistant arrested for assault. The case went to the Court of Appeals, where it was held that "this rule that the ticket for whatever remote point, and however numerous may be the intermediate stations, shall be surrendered without a check, immediately after entering the cars, may be very convenient for the corporation, but it is extremely liable to be made the instrument of abuse toward the passenger. Where a man has yielded his ticket for the convenience of the corporation, he ought not to be placed in the dilemma of paying again for his passage or being ejected from the cars." Judgment was entered for the complainant. In another case, a passenger took his seat in the train at Chicago for Newcastle, and his ticket was immediately taken up. There being a change of conductors, the passenger had nothing to show that he had paid his fare to Newcastle and was put off the train, the conductor regarding him as "a beat." He sued the railroad company and recovered a verdict of \$500, which the Supreme Court of Indiana affirmed on appeal. It is the right of every passenger who surrenders his ticket before his journey is completed to have a receipt for it, and if this is refused he should decline to surrender it, taking the chance of recovering damages in case he is put off the train. Regular travelers are not often caught napping, but occasionally they find a conductor who delights in making them all the trouble he can, and it is just as well to know the law on this point.

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PROPERTY OWNERS, jewelers included, may expect a speedy raise in their rates of insurance. All the companies doing business in New York and vicinity have entered into a combination that has for its object the raising of the rates charged for insurance. The compact, which has been signed by 157 companies, all doing business in the metropolitan district, provides that no company shall pay more than ten per cent. commission to the brokers, and binds these not to divide with the insured any portion of this ten per cent., and also provides that every risk in the district, except dwelling houses, shall be rated, and that no company shall write any risk at less than the schedule rate. Thus there can be no more cutting of rates, no more dividing commission with your broker, but every one must pay the full rate assessed against his property. The companies have been

trying to get up a combination of this kind for the past five or six years, but there have heretofore always been some "kickers" who would not go into the arrangement, but this time a degree of pressure was brought to bear on them that forced them to come into the traces. The advance in rates is not likely to be sufficient to materially injure anyone, but, as the companies have been losing money for several years past, there is a necessity for their doing something to redeem themselves. The principal cost of insurance for some time past has been in the expense of doing business, and the expense has largely lain in the exorbitant commissions paid to brokers, these ranging anywhere from 15 to 40 per cent. The present arrangement makes a big cut on the brokers, but they still have enough left in their 10 per cent. Still, if any property owner complains that his rate is too high, he can readily get it reduced by providing better means of fire prevention and protection—the companies are willing to pay a premium for the adoption of the most approved methods of preventing fires.

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THE danger of selling alleged precious stones before they are properly classified and their value fully determined, was illustrated recently in France. A stone was introduced that was believed to possess characteristics that entitled it to be regarded as a precious stone, and a number were sold at a high price. Subsequently experts classified the article, placing it among those that had no claim to be regarded as precious—as having been artificially produced. Then the question came up as to what was to be done about those that had been sold at a fictitious value, and it was held that the sellers must redeem them at the price they had received for them. It is always bad policy to go off at half cock, especially when there is danger of a recoil from the weapon that is likely to hit the pocket.

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A VETERAN jobber recently said that comparatively few dealers understood how to properly display their stock, or the advantage of so doing. A dealer, for instance, fills a show case with silverware, and there it remains without change year in and year out. He may make additions to it occasionally, but there stands the same old show case with its accumulation of silverware, and no one will notice whether there are new goods in it or not. His customers get used to seeing that case in the same old place every time they come in, and, as there is no change in its position or dressing, they take it for granted that it contains the same old stock and do not give it a second glance. If the dealer would change his display every little while it would have all the effect of a new stock. Take out the old things that have been half concealed for want of sufficient room to exhibit them properly, bring them prominently to the front, give them the place of honor for a little while, and your customers will think you have been getting in a new stock of goods. Take the shop worn silverware, polish it up, keep it out of sight for a time, and then bring it back and display it conspicuously again, making a new arrangement of the pieces, and you have created a new interest in it and may safely announce it as new stock. You probably have a special case in which you keep watches; you have a fine assortment, but the public gets tired of looking at the same things day after day, and they cease to interest or attract attention. Take out the watches and fill the case with your best specimens of jewelry, arrange them carefully and set these up for your "leader" for a week or two. By constantly changing the arrangement of your exhibition goods you whet the curiosity of the public, attract customers, and get up a reputation for enterprise in keeping up with the styles in new goods. In this way goods that have been shelved for a time are made to appear as fresh stock, and the chances are that the change will result in

selling many articles that had been regarded as unsalable. Frequent, if not daily, change should be made in the disposition of goods in the show windows; there should always be something novel that will cause passers-by to pause and take a survey of the interior. The public likes novelty and change, and the busiest man that walks the streets may be found at times gazing into the shop windows, his attention having been almost unknowingly arrested by the display of something that appealed so strongly to his curiosity that he could not resist the temptation to tarry awhile and study it. It is a considerable of an art to display goods to the best advantage, but it is an art worth studying.

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THOSE manufacturers who are in the habit of getting out catalogues and of sending price lists to members of the trade should carefully revise their lists of dealers at frequent intervals. It often happens that men who have been out of the business for months or even years continue to receive these documents from the publishers, who have failed to note the fact that they have left the business. We recently saw a circular returned to the sender by a postmaster who endorsed on it the fact that the person addressed had not been in his town for three years, having "given up business and gone to rail-roading." In many cases the catalogues are delivered to the persons addressed, and they being out of the business have no hesitation in showing them to any one who has any curiosity to see them. Catalogues unaccompanied by price lists are not calculated to do much injury, but as even these are designed especially for the trade, it is better to adopt every precaution to limit their circulation to those who are actually engaged in the business. If manufacturers would carefully note the "Trade Gossip" in each issue of THE CIRCULAR, they would be able to make many corrections to their lists of dealers, not only marking off those names that are no longer entitled to be recognized, but changing the names of firms as the firms are changed. It is due to dealers in general that their business designation should be properly observed by those who desire to communicate with them. A little more care in this matter of addressing catalogues and price lists would have a tendency to reduce the number of such as fall into improper hands.

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A MUCH better feeling has pervaded the trade during the past two months than has been visible in several years before. Every manufacturer and jobber reports business good and his entire satisfaction with the condition of things. Buyers have been numerous in the city, while every mail brings in any quantity of orders. Travelers on the road report that trade is good in all sections of the country, and that retail dealers are feeling greatly encouraged. They report the harvest to be excellent, and the money realized from them is already getting into general circulation. Retailers are having a good demand for articles in their line, and anticipate a still better demand when the farmers shall have completed their fall work. All this is most encouraging, but the jewelry trade can stand a considerable prosperity, for it has experienced a period of dullness that has extended over several years. In the revival of activity that is upon us, it is to be hoped that no man in the trade will forget that he is entitled to a fair profit on his sales, and that he will abstain from all cut-throat practices that are calculated to depreciate the value of his goods. It is folly to do business unless there is something to be made by it besides merely paying expenses. Every community is best off when every member of it is doing a good business on satis-

factory terms; the prosperity of individuals secures the prosperity of the nation.

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THE Jewelers' Board of Trade continues to do most excellent work in the interests of the trade, furnishing much valuable information to its members that they could not otherwise obtain. The Secretary is a very busy man, devoting his whole time to the interests confided to him, and the data he has accumulated for reference bears witness to his industry. The wonder is, in view of its usefulness, that the trade got along so many years without this valuable adjunct to facilitate its business.

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SOME years ago Mrs. General Sherman, assisted by numerous other Catholic ladies, had made in Paris a beautiful crown for the Virgin Mary's shrine in the University of Notre Dame, at Notre Dame, in Indiana. Early last month some sacrilegious thieves broke into the chapel of the University and stole this particular crown and one other that had also been presented to the University. The one with which Mrs. Sherman's name is identified is described as having been a very elegant and artistic piece of metal work, five French workmen having been employed continuously for three months in its construction, and twelve others for two weeks. It contained twenty-three and a half pounds of pure silver and two pounds of pure gold. There were sixteen miniature paintings on porcelain, representing scenes in the life of the Saviour, fitted in the crown, surrounded by sixty-four turquoises and sixty-six other precious stones, while the metal work was hammered and embossed. The smaller crown was the gift of the Empress Eugenie to the University, and was also a rich and valuable specimen of metal work, having been awarded a prize for artistic workmanship at the Paris Exposition. The thieves broke up both the crowns, but one of them was captured with the booty. While the metal and precious stones were recovered the workmanship has been destroyed beyond repair, and, from an artistic standpoint, the loss is important and irreparable.

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ENTERPRISING advertisers are constantly seeking unique methods of attracting the attention of the public. The city dailies are examples of what our business men can do in the way of oddity, but some Western advertisers can discount them at this game. We were recently shown a hand bill issued by a retail jeweler in a distant mining town, wherein he announced the arrival of some new goods, accompanying their description with the profane adjectives so common in that locality, which were, no doubt, more intelligible to his customers than good choice English would have been. A recent St. Louis paper contains the advertisements of two local dealers who are running amuck with each other in big type and much printer's ink. No. 1 places in his show window four jars containing a large number of beans each; a prize, consisting of a fine gold watch, is attached to each jar, to be awarded to the person who guesses the nearest to the number of beans contained in the respective jars. As it might be possible for a person with a mathematical turn of mind to measure the superficial area of the jars, and then by experiment arrive very closely to the number of beans, it is announced that a number of beans are carefully boxed up in each jar, thus throwing out the mathematical calculator. No. 2 makes a similar offer, but puts his beans in botties and permits only ladies to compete in the guessing, the prizes being a gold watch and chain and a gold headed umbrella. The beans to be officially counted by three popular St. Louis ladies

to decide the guessing. As it was fair week during the contest, these advertisements no doubt served the purpose of the advertisers, and attracted custom to their respective stores. The most attractive advertising is that which shows to the reader, by illustration or description, what the advertiser has to offer to the public. To this end THE CIRCULAR has encouraged its patrons to illustrate their advertisements, and has secured the services of competent designers and engravers to make drawings and cuts of goods that a patron may desire to call attention to. As a consequence, THE CIRCULAR advertisements are not only full of information for the trade, but are artistic and elegant. However such advertising as we have alluded to may serve to catch the masses at a fair, there is no question but artistic advertising is what counts when appeal is made to a select audience of competent critics, as the dealers in jewelry unquestionably are.

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THE readiness with which a true born American can adapt himself to changing conditions and make the most of his opportunities, finds another illustration in the person of Chas. W. Ward, of Detroit. Two years ago he was at the head of an extensive lumber business in Michigan and the possessor of an ample fortune; to-day he is the promoter and executive head of a watch manufacturing industry at Geneva, Switzerland. About two years ago Mr. Ward was ordered abroad for his health and forbidden to have anything further to do with the lumber business. Although abundantly able to live in idleness the remainder of his days, Mr. Ward had no intention of doing so, and finally became interested in the enterprise to which he now intends to devote his time and energies. The company with which he is identified is known as the Geneva Non-Magnetic Watch Company, organized under the laws of the State of New York, but having its factory at Geneva. Its officers are David Ward, President; C. W. Ward, General Manager; H. W. Struss, D. E. Seybel, W. S. Ward, C. A. Paillard and Louis Bornand, Directors. The president is represented to be worth from \$15,000,000 to \$25,000,000. The company is organized to utilize Paillard's Patent Non-Magnetic Balances, and will have an office in New York. A feature of the Geneva establishment will be an extensive library for the use of American tourists.

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WHILE it is the intention of our patent laws to give to a patentee the exclusive right to make, use or sell the article patented, and to prevent all other persons from using such invention without the consent of the owner of the patent, the courts will not sustain him in playing the dog in the manger, neither making the patented article nor permitting others to do so. A case to this effect was decided recently by Judge Blodgett, in the U. S. Circuit Court for the Northern District of Illinois. It was the case of Hoe & Co., the well known printing press makers, against Knap. It appears that Hoe & Co. are the owners of a certain patent which they have never used; Knap desired to use it but could not get permission to do so, and so went ahead and made presses, using thereon the patented device. Hoe & Co. applied for an injunction which was denied, but Knap was required to give bonds for an accounting. When the case came to trial Judge Blodgett gave his decision as follows:

The question arises whether the court will grant an injunction in favor of the owner of a patent who has not, after a reasonable time, put it into use, against another who is using it. I think, under a patent which gives a patentee a monopoly, he is bound either to use the patent himself or allow others to use it on reasonable or equitable terms, and, as I refused an injunction on the motion before the hearing, I shall refuse an injunction in the interlocutory degree, and allow the defendants to continue to use the patent on their giving bond as they have heretofore.

This policy may seem a little hard on owners of patents, but it is

unquestionably in the interests of the public. It virtually says that the public shall not be deprived of a valuable device simply because the owner of the patent does not see fit to put it on the market. At the same time it protects the owner by requiring the user to make an accounting with a view to the payment of reasonable royalties. It is a pity this decision could not be enforced against the Western Union Telegraph Company, which is known to own patents which, if put in use, would reduce the cost of telegraphing more than one-half. The same is true of the Bell Telephone Company, but both of these great corporations prefer to employ their present plant to putting into service new appliances that would reduce the cost of the telegraph and telephone service very materially.

The Jewelers' League.

President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
 First Vice-President, WM. C. KIMBALL.....Of Strange & Bro.
 Second Vice-President, AUG. KURTZBORN.....Of Bauman Jewelry Co. St. Louis, Mo.
 Third Vice-President, ROBERT A. JOHNSON.....Of Colby & Johnson.
 Fourth Vice-President, JAMES P. SNOW.....Of G. & S. Owen & Co.
 Secretary and Treasurer, WILLIAM L. SEXTON.....Of Sexton & Washburn.

EXECUTIVE COMMITTEE.

GEORGE R. HOWE, Chairman.....Of Carter, Sloan & Co.
 JOSEPH B. BOWDEN.....Of J. B. Bowden & Co.
 CHARLES G. LEWIS.....Of Randel, Baremore & Billings.
 E. S. SMITH.....Of Smith & Knapp.
 WM. BARDEL.....Of Heller & Bardel.
 J. R. GREASON.....Of J. R. Greason & Co.

THE JEWELERS' CIRCULAR is the exclusive official paper of the Jewelers' League, and has been selected for the publication of all matters of interest pertaining thereto. Letters or inquiries pertinent to its business or purposes, and which might interest the trade or inquirers, will herein be answered. Address Jewelers' League, Box 3,444, P. O., New York, or the office of THE CIRCULAR.

At the regular monthly meeting of the Executive Committee held Friday, October 1, 1886, there were present President Hayes, Vice-Presidents R. A. Johnson and W. C. Kimball, and Messrs. Howe (Chairman), E. S. Smith, J. B. Bowden, C. G. Lewis, J. R. Greason and W. L. Sexton.

Two (2) changes of beneficiary were granted.
 Two (2) applications were referred for investigation.
 The following applicants were accepted:

C. L. Byrd, Memphis, Tenn.; Barnett F. Gordon, Middletown, N. Y.; Fred. D. Heffron, New York City; Joseph P. White, Brooklyn, N. Y.

The Secretary was appointed a delegate to attend a convention of "fraternal benefit societies," to be held at Albany on the second Thursday of November, 1886.

A vote of thanks was passed to THE JEWELERS' CIRCULAR for its able and complimentary editorial in the September issue.

A sub-committee was appointed to prepare and report to the Executive Committee a plan for the introduction into the League of one or more benefit rates for persons desiring smaller amounts of insurance. To this sub-committee was referred a communication from the Secretary providing for a decrease in the compensation of the Secretary's office.

The above matters will be formed into amendments to be acted upon at the next annual meeting of the League.

Dip Gilding.

IN MY LONG practice, says E. Gerwitz, in the *Deutsche Uhrmacher Zeitung*, in answer to a query-ist, who complained of the qualities of the commercial gold solution, I have found them generally efficient for our purposes, if used in the right way. The many failures often experienced by parties, in their first attempts of



gilding, are invariably due to the fact that they do not know how to use the solutions properly.

Before an article is to be entered in the gold bath, it is unconditionally and indispensably necessary that it be cleansed in the most perfect manner attainable, since the most trifling trace of any foreign body suffices to prevent the adhering of the gold. The series of operations, for the purpose of cleansing, is called scouring, which differs with the kind of articles to be gilt. For copper and its alloys, which is about the principal metal coming into the gilder's hand, the scouring operation is the most difficult and requires the following chemical operations, before the article to be gilt is fit for the operation:

1. Scouring with potash, lime, or caustic potash. 2. Pickling in sulphuric acid. 3. Passing through old nitric acid. 4. Passing through nitric acid and lamp black. 5. Passing through an acid mixture. 6. Passing through nitrate of mercury. The experienced operator will now understand why he has so frequently obtained black spotted gilding, and that this was not the fault of the gold solution. A number of times were gildings, in other respects quite satisfactory, sent to the writer for his opinion, accompanied by the query, why the gilding had turned out so brown; and the only answer he could return was, because the operator had not understood to treat the gilding, which generally turns out brown at first, with the scratch brush or rubbing with fine wet sand, so as to produce the luster.

The tyro who makes his first attempts at gilding or silvering, should begin with a small smooth article, and gradually increase his experiments, so as not to experience too much loss and disappointment, a heavy dose of which he will feel anyhow.

Every dip or contact gilding, which is performed without the assistance of a battery, is, strictly speaking, only a coloring of the article. A well adhering coating is produced by first gilding the article once; the article is then dipped into a solution of nitrate of mercury and entered again in the gold bath; this operation is repeated several times, until the gilding has obtained the required thickness and adhesiveness. The thin film of nitrate of mercury forming each time, is dissolved again in the gold bath, to make room for another layer of gold, which has a great affinity for quicksilver, and separates from the gold bath to combine with it.

This writer has used this method for the past two years, and has gilt articles in this manner for which he had to employ a battery heretofore. The method is also preferable to that by using the battery, because the gilding obtained by dipping is distinguished from the latter kind by a softer tone, greater luster and purity, as only pure gold will deposit, while by gilding with the battery a basic salt of gold will invariably separate.

The thickness of the gold film deposited can be easily tested by trying it from time to time with nitric acid.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

SHOPPING began in earnest October first, and every pleasant day since has added to the number of fashionably-attired women who, eager to inspect new styles, throng such stores as provide for a fine trade. Nowhere do these fair shoppers congregate in greater numbers than at the salesrooms of our leading retail jewelers and silversmiths. It is safe to affirm that double the sales have been made in jewelry and silverware within the past six weeks, than before in several years at a corresponding season. A feature apparent even to average observers is the freedom with which jewelry is again worn by ladies on their shopping expeditions. While gems continue to be reserved for full dress occasions, gold and silver ornaments are now

worn with street costumes to the extent of at least a brooch, cuff buttons, collar button and watch and Queen chain; bracelets of simple construction being often added. Thanks to the artistic and dainty patterns now prevailing in the better grades of jewelry, ornaments may be worn in profusion without producing the overloaded effect complained of in the days of more massive styles.

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THE attractions offered by the retail stores are not only numerous, but varied. Novelties from Paris and London have been imported in larger quantities than before in many years. The importation of diamonds for the trade this season, it is claimed by those who ought to know, exceed the importations of any previous year by a very large amount, and the same may be said in regard to other popular gems. New York buyers went abroad this summer without fear or trembling, and bought unhesitatingly with the assurance that the money expended would be returned to them with generous interest. There is not only a large influx of new things from all parts of the old world, but our own manufacturers have placed on the market unusually full lines in every direction. The result is, as has been intimated, a wide and varied assortment for the selection of retail patrons.

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AN IMPORTANT feature of the recent importations is the large number of rare gems included. These embrace an unusual number of flawless and large sized diamonds; fancy colored diamonds showing positive shades in pink, green, absinthe, amber, blue and other hues; pearls in fancy colors, and rare rubies and emeralds. Every importer visited this month had in his collection numerous fine opals, and every one felt confident that these gems are in for a popular run. This feeling of confidence among importers regarding the opal is substantiated by our retail dealers, who are exhibiting the opals in rings, brooches and pendants along with leading novelties.

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THESE opals are attractively employed in fly pins, where the body is formed of an oblong-shaped opal and the wings of small diamonds set in a light net-work of gold. The opal appears also in round brooches, where the newly-revived stone acts as the central gem with several circles of small diamonds around it. Rare Hungarian opals of wonderful splendor are employed with fine effect in both cluster finger and cluster ear rings. In these the opal is the important and center gem, around which are clustered diamonds of smaller size. One of the most beautiful opals seen this season was of medium size, but with remarkable fire and brilliant colors; this was set between two brilliant diamonds of uniform size on a square shank finger ring.

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THE prominence already gained by cluster rings is worthy of note, and the increased size of these clusters is a surprise to many. The fancy in these is for a rare colored gem in the center with small diamonds around it, though other combinations are of frequent occurrence. A beautiful cluster ring seen in Maiden Lane had for its central gem an immense and very fine pearl, encircled with diamonds. Ear rings were also shown by the same firm set in similar fashion. One not only sees gems set in round clusters, but in Marquis style. Quite new are what are termed double cluster rings. These consist of a square shank ring with overlapping ends, mounted

with small clusters of diamonds and showing center stones of different colors, as a sapphire and a ruby.

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BOTH manufacturers and retail jewelers bear evidence to the increased use of ear rings. After the solitaires come the gem cluster rings, then the hoops and balls. There is also a popular line of goods in flower patterns, where a single small flower or a tiny leaf serves as the drop. A circlet of pearls or diamonds is one of the most attractive among the hoop ear rings. To wear with these come brooches in form of a garland set round with gems. In these circular pins two or more kinds of gems often alternate, as a ruby, diamond and sapphire.

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A MAIDEN Lane manufacturer who has laid in a stock of fine diamonds, is showing a new setting for solitaire ear rings which is likely to attract widespread attention. This setting consists in a narrow band or wire of platinum around the edge of the stone; a setting that does not appear to view when the ring is in the ear, and which leaves the back of the stone as open as the face. The advantages gained by this setting are especially apparent when the gem is hung to swing as a pendant; in any case its merits are too obvious to require specification.

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AT THIS same house was seen an attractive combination of pearls and diamonds in a star-shaped pin. A fine pearl appeared in the center, and from it radiated the diamonds that formed the star; between each point in the star were set medium-sized pearls. The result was an effective and unique brooch.

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A FRENCH novelty in way of half mourning jewelry seen recently employs diamonds in oxidized silver settings, made to resemble iron more than any other metal. These settings are light and delicate, and, it must be confessed, afford an admirable background for the gems. This jewelry is made, for the most part, in flowers or sprays, small brilliants being set in the latter, and important stones in the center of the former.

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BLACK onyx jewelry, with and without pearls and diamonds, leads, as usual, all other styles in the finest grades of mourning jewelry. Then comes the fine enameled work or the best grade of crape stone jewelry. All are in stock and all are required to meet the varied demands made on the retail jeweler.

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LOUIS XIV., XV. and XVI. styles of jewelry, already favored by French women for evening wear, are represented by the New York houses that cater to an exclusive fine trade, and will doubtless take well among society people this winter, for our modistes are reproducing in modern evening and ball dresses the fashions that prevailed

in gowns during the periods mentioned. These reproductions do not stop at brooches, shoulder knots and hair ornaments, but have appeared in ladies' watches as well.

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BROOCHES in which appear miniature portraits and various small subjects, also pictures in fine Limoges enamels, are now to be seen in every store that boasts of a fine trade. These paintings are set, as a rule, in a circle of small brilliants or pearls. Occasionally one sees ear rings made in similar fashion, the painted medallions in these being, of course, much smaller in size. It need hardly be told that this class of jewelry is highly prized, not only because of its intrinsic worth, but from its artistic merit.

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NATURALLY the fine enamel work of our own manufacturers is in demand, but there is little sale for inferior productions in this line, the average buyer preferring plain gold or silver jewelry to that which shows crude colorings and bad workmanship. Unusually fine enamel work occurs on the new flower and fly pins, both in gold and silver. An attractive silver brooch is one in form of a tambourine, in the center of which appears, in colored enamel, the picture of a girl dancing to the music of a tambourine she is playing on. The chestnut scarf pin, which has been affording young people an attractive medium through which to play practical jokes on loquacious friends, is another instance of fine enameling, the nut being closely simulated in color as well as form. A very pretty necklace seen in enameled silver consisted of a chain of forget-me-nots. Beautiful effects are gained in watch cases by a combination of colored enamels and raised wire work.

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HEAVY chasing continues a popular finish on gold jewelry, new collar buttons show it, so do immense lines of ladies' and men's cuff buttons and the newer ball ear rings. A combination of styles in one ornament is frequently employed, such as chased and Roman gold and opalised and bright finished surface. The opalised finish, a notable instance of what may be done with a harmonious association of vari-colored golds, is seen this autumn in many articles of jewelry. It is especially popular on cuff buttons. This opalised jewelry, as old readers well remember, shows a tessellated surface composed of minute flecks of gold, which produce a play of many colors and afford a very unique line of goods. The association of gold and platinum, especially in men's chains, continues. Indeed, much of the gold jewelry in the market now owes its ornamentation to a combination of metals and several styles of finish.

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MOONSTONE jewelry, especially in silver, continues to find favor. Among new designs is that of the man in the moon with a moonstone in his mouth. Moonstones are now set in garters; then there are watch chains formed of a series of graduated moonstones. Moonstone flies make popular scarf pins and brooches. One brooch seen represented a snake coiled around a moonstone.

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ORNAMENTAL hair pins continue in favor; sometimes the pin is of tortoise shell with a gem or gold ornament at the top. Again, the

ornament takes the form of a small jeweled comb. Not only are these ornamental long pins used in the hair, but Paris trimmed bonnets show them as well, the pin being thrust through a knot of gay ribbons, or used sometimes to secure a bunch of nodding feathers. Many of these are made entirely of gold or silver.

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THERE is nothing particularly new to tell about bracelets. They sell well in the prevailing styles, being worn now by all classes of society. Cuff buttons are another good selling article, and there is a decided tendency to cuff pins again. Locketts are in high favor, especially for men's wear, and show many new and pleasing designs. Studs are in increased demand, and yet scarf pins keep their hold on the public's favor. The old bar pin is still seen, especially the knife edge ones, set in the center with a fine gem.

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THE Campanello bell, for which there was a craze last spring, no longer tinkles from the garters worn by love-lorn ladies. The rage now is for garters set with two crystal medallions in silver rims, the crystals each enclosing a pressed four-leaved clover, "she and he," plucked during a certain red letter day that will henceforth mark the summer of 1886, and which foretells a late autumn wedding. It may further be told that these souvenir garters are having a big trade, and when the fair wearer has no pressed clover leaves to preserve, forget-me-nots or other flowers that speak love's language may be substituted.

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CELLULOID boxes, lined with velvet or plush, are novelties in way of jewelry cases, and are provided for brooches, ear rings and finger rings. These novelties come in amber, tortoise shell, onyx and ivory effects. Entirely new are the jewelry cases covered with silk and simulating a packing box, cleats, label and all. Both these styles are entirely novel and will doubtless take well with the trade.

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NOVELTIES for the table introducing English fashions and finding ready patrons, are tiny lamps of unique shape with silver or faience bowls and colored shades. These new lamps are designed to take the place of wax candles and candelabra on the dinner table. One lamp is placed between two guests, or six lamps are employed for a table laid with twelve covers. As each lamp differs in form and finish, as well as in the color of its shade, the result is exceedingly effective. For patrons who may not aspire to the use of the more expensive lamps, are provided "fairly lights" in vari-colored glass bowls or globes, which produce the desired blending of colors, and continue to shed their lights through the many courses of an elaborate dinner.

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QUIE English, too, are the miniature casters in sets of four for breakfast and luncheon, to be placed at the four corners of the table. These toy affairs are very dainty in effect with their light silver framework and odd-shaped bottles of cut glass. In this connection may very properly be mentioned an unusually large and varied assortment of "sugars and creams" in unique patterns and artistic finish. Coming to new things in more imposing pieces are crystal punch bowls

of generous proportions with elaborately wrought silver covers, resting on silver trays.

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PRETTY luxuries for the toilet were never in greater demand than at the present time, and these are not only in stock in great variety, but are being made in large numbers for the holiday trade. Milady brushes her hair with a silver-backed brush on which designer and artisan have produced their most artistic effects. The comb with which she finally adjusts her locks is of tortoise shell and finished with a silver back. Her powder box is of silver, richly carved, chased, engraved or etched, when it is not overlaid with enamel or set with jewels. Tooth brush, lace brush, clothes brush and whisk brooms are provided with handles and backs that show the silver-smiths' best work; in a word, milady's toilet table is loaded with all sorts of necessary and practical articles, worth their weight in gold, from the elegant manner in which they are made and the precious metal employed in their ornamentation.

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QUIE new and decidedly attractive are the silver cologne bottles that simulate the wicker cover and foreign label of the celebrated Farina cologne bottles. These are only one of many curious and beautiful productions in silver that take their models from practical everyday objects. And this is as good a place as any in which to call attention to the magic pencil cases that have proven so acceptable, especially among young men, and which, by the aid of colored enamels, are made to represent all sorts of subjects, such as a half consumed cigar or a stub of blue cedar pencil.

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SILVER trimmed leather goods represent popular and fashionable articles, such as pocketbooks, purses, card cases, portfolios and other things made in leather. The long narrow pocketbooks with silver corners and clasps, described in detail when these first came out, represent the fashionable pocketbook this autumn. New York ladies select these to match their gloves and costumes in color, for all the new shades in millinery and dress goods are represented in the new leathers. Fashionable leathers in these silver-trimmed goods are pig and monkey skins; then there are the Japanese decorated leathers, trimmed with gold bronze corners and clasps, and standard sorts such as seal, Russia leather and alligator skins.

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COLORED silk umbrellas, with fine sticks and silver handles, are finding favor and promise to have a big run during the holiday season. Umbrellas covered with silk of a new blue shade are quite fashionable. The silver handle in some of these new umbrellas extends so far upwards on the stick, that it may almost be said the umbrellas have silver sticks. For an exclusive fine trade have been made a few specimen parasols and small umbrellas with silver ribs, finished with colored stones, that appear like little knobs on the points. Many of the new umbrella handles and cane heads are made by the silver deposit process, in which the silver is thrown upon wood or horn, and follows all the natural markings and contortions of the same, thus producing very unique effects.

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THE tendency to carry diversified stocks among jewelers and silver-smiths is one of the signs of the times and therefore merits remark.

Not only have fancy goods and bric-a-brac appeared on the shelves and in the shop windows, but fans, canes, parasols and umbrellas are carried in well assorted lines. Leather goods is a leading feature, so is fine stationery, decorated menu cards and the like. Menu stands in old silver, in form of odd scrolls, plaques and similar devices, find a ready sale in cities, and are therefore kept by leading city houses. Jewelers in cities do a thriving trade during the winter season in *fantaisies* in way of favors for the Germans. Some seen duplicate, in petite form, huge jars and vases from celebrated faience factories. Sometimes these miniature productions are of pottery, but oftener they come in silver, brass, copper or even iron.

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AT THIS season bridal favors are an important item, and are usually exhibited in enamel, gem and gold ornaments. Eidelweis appears as a favorite model this season in form of a brooch. Pansies in violet enamel, with diamond hearts, represents a popular fancy.

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Music boxes, which come under the head of luxuries, are akin to jewelry and silverware, and therefore ought to be in stock, not only in city stores, but in towns and villages. Now, there are music boxes and music boxes, and one must use due discretion in making selections that the right sort shall be on hand for each special line of custom. For instance, in small country places, rich inlaid boxes that sell readily in cities, are beyond the reach of the average buyer, therefore good instruments in less elaborate cases should be provided.

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A FACT in connection with music boxes not generally known is the difference existing between what is termed the "interchangeable cylinder music box," and the music box in which the cylinder cannot be changed without sending the instrument abroad to the factory where it was made. With the interchangeable cylinder music box, when one is tired of the original repertoire of its music, new melodies can be introduced at a comparatively small cost by the substitution of new cylinders to which the box accommodates itself. This fact is an important one and should be considered in the selection of these instruments.

ELSIE BEE.

Optical Enquiries and Answers.

[BY C. A. BUCKLIN, A. M., M. D., NEW YORK.]



HAVE received at least fifty personal letters, of which I print a few samples. Some desire to become scientific opticians, and others desire to be "eye doctors," without going through the preliminary steps of graduating in medicine.

GREENCASTLE, Ind., Sept. 23, 1886.

Dr. Bucklin, New York:

DEAR SIR:—I suppose you will remember me as having had my eyes tested by you two years ago.

What I wish now is to know if there is such a college in New York where they teach a person to be an optician. I do not mean to be an oculist, but an optician. If there is such will you be kind enough to give me the address? Oblige yours truly, S.

The enquirer who wrote this letter shows good sound sense. He wants to be what it is possible for him to be, namely, a skilled optician. If he attempted to be an "eye doctor," without being first a

graduate in medicine, he could never command the respect of reputable people, and would in most States be liable to severe punishment for each and every time he officiated in the capacity of "eye doctor." In answer to the direct enquiry of the above letter: If there is a college in New York where they teach a person to be an optician, I must say there is no such college in the civilized world where the theory of optics as applied to the correction of refractive errors is taught to persons desiring to become skilled opticians. To meet as best I can the requirements of my many correspondents, I will commence in the January number of THE JEWELERS' CIRCULAR a most elementary course of written instructions on "How to Become a Skilled Optician." It will commence with the very elements of refractive phenomena, and be carried out to the practical application of the principles to the fitting of lenses.

After the first week in January if there are six of my readers who wish to come to New York to receive such instruction as is necessary to make them thoroughly practical opticians, I will see that the necessary appliances and clinical material is collected, and will attend to the personal practical training of each student myself. The course will be completed in two weeks, and will cost each student fifty dollars. Sufficient practical experience will be given to each student to make him thoroughly familiar with every difficulty he may meet with. The course will also include sufficient practice in the use of the ophthalmoscope to enable the student to detect cataract in all its stages.

I cannot see any reason why those desiring to follow the calling of an optician should not receive systematic and thorough instruction in this special branch. If there is a demand for this kind of instruction I will do all I can to have it supplied in a satisfactory manner.

Applications must be made to Mr. Hale, of THE JEWELERS' CIRCULAR, and to insure good faith ten dollars must accompany the application, the balance being paid when the class of six has been formed. Should the requisite number not apply, and it is not thought advisable to incur the expense of collecting clinical material for practicing upon, Mr. Hale will return the applicant the ten dollars deposited. If this beginning should result in the founding of a permanent school in New York City for training opticians, it would be an amusing surprise. I publish two letters received regarding this subject, and assure my readers that they are only samples of many. The following letter is sufficiently answered by the above propositions.

YOUNGSTOWN, O., Sept. 16, 1886.

Dr. Bucklin:

We have been dealing to some extent with Spencer Optical Co. in the spectacle line. We wanted to learn to fit practically, and have corresponded to that effect with Spencers, who have referred us to you direct. We therefore would ask you to be kind enough to let us know about how long it would take under your instructions to learn to use a test case of lenses with ordinary success, and under what terms you would take a pupil to merely learn the use of the test case properly. We would ask you for full information on the subject. Respectfully, G.

Several letters have been received from young men who have been astounded at what would appear to be the immense success of opticians who travel under the title of "Doctor." They wish to become "eye doctors" without any familiarity with the principles and practice of medicine or surgery. Satisfactory success cannot be obtained by living a life of fraud, without constantly traveling, and even then results are rather doubtful, and not to be compared with the results which can be obtained from a first-class optical trade combined with a jewelry trade in a live town.

COSHOCOTON, O., Sept. 21, 1886.

Dr. C. A. Bucklin:

I have a complicated case on hand which I wish you to state if you can correct with glasses. It is in the person of a little boy 13 years old. He states he always was affected since birth with this

trouble. He is unable to see at all unless he holds the manuscript almost against his nose. In looking at any object, say six feet from him, he dilates the pupils of the eyes considerably, and seems to try and open his eyes *wider* than natural. At six feet he reads line L with slight difficulty, but cannot make out any letter in line XL. On page 73, Test 1, in "The Gallic Tribes," etc., must be held up *within* three inches of the eye to see at all, and then it is quite indistinct; the nearer the object is held the better the effect. On same page, Test 5, "To present the self-same drama," etc., held at five inches, can see some to read. Astigmatic test shows no indications of astigmatism. No. 5 periscopic convex lens are the only ones that make any perceptible difference, and with these it makes the letters look *blacker* at six inches from the eye, ordinary print. On giving him three pairs specs to try on he selected these (No. 5) each time. The others were Nos. 8 and 15 convex. Also in concaves same numbers were tried, but with no result. The superintendent of schools has had the boy to suspend school until I hear from you, as he cannot possibly do any good as he is now. Awaiting your early reply, I am
Very Respectfully Yours,
J.R.

Slightly cross-eyed in left eye.

Doctor will you please answer this and oblige W. H. F.

There are several possibilities in the above case. Excessive hyperopia may be the only trouble, as the acuteness of vision in such cases is generally greatly reduced owing to the defective development of the eye.

Congenital cataract is also a common cause for these phenomena, and is most probably the cause in this case.

Other children have their vision cut off early in life by cerebrospinal meningitis. If the writer of the above letter is sure there is no astigmatism, he probably has done as well as it is possible for any one to do with lenses. I strongly suspect congenital obscurity of the crystalline lens in this case, the existence of which could be demonstrated instantly with the ophthalmoscope.

ATLANTIC, Iowa, April 4, 1886.

Dr. C. A. Bucklin, New York :

DEAR SIR:—Being encouraged by the last clause of your article on "Hearing" in the April number of THE CIRCULAR, we ask: Why is it that I can hear the beat of our pin escapement regulator at ten feet, and *cannot* hear the watches on the repair rack at a distance of three feet, the number of watches running being about thirty; and with my wife (also a watchmaker) it is the reverse. She hears the watches on the rack at a distance of six feet, and the regulator at a distance not over four feet?

If our readers will refer back to the March and April numbers of THE CIRCULAR they will find some very interesting phenomena explained. The ear is no exception to other musical instruments, it may be so tuned from birth or disease as to appreciate certain sounds, vibrations or musical notes with great distinctness, and completely fail to appreciate them if the octaves of the same note is sounded. The explanation of the above will be found by carefully perusing and applying the principles explained in the above-mentioned numbers of THE CIRCULAR.

I have tried to answer such enquiries as have been made by the patrons of THE CIRCULAR which want of space has compelled me to neglect for several months. We will consider in our next nasal catarrh and its influence in causing chronic diseases of the eye-lids.

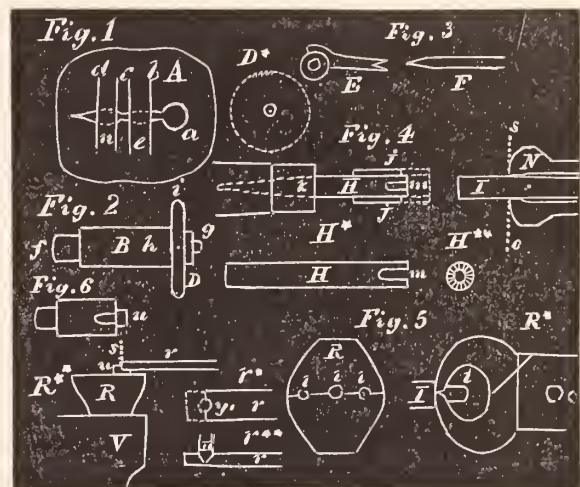
Advice to Watchmakers' Apprentices.

BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



AFTER DESCRIBING the manner of adding a tooth to a cylinder escape wheel with soft solder, it might not be amiss to give another example of the use of mica, which is again a different application than to spectacles and eye-glasses, which we have been considering now for some time. Not unfrequently a watchmaker gets

watches with unusual hands, and these broken. This happens oftener in fine English lever watches with really nice gold hands, and something that to procure a new one would be next to impossible. To come to the point, and tell how to mend a watch hand and do it expeditiously. We take a piece of mica, say, as large as a quarter of a dollar. No matter about the exact shape, only so it is large enough to support the hand. We first punch a round hole through it as shown at *a*, fig. 1. Next make 4 slits as shown at *b c d* with a knife. At *e n* is shown two straps of mica, with a narrower one (*c*) intervening. We all know that mica splits very readily. We now, with a thin knife point, split *e* and *n* and insert the two pieces of hand as shown, leaving the part to be joined exposed. As mica does not deteriorate or soften by heat, the parts are held perfectly in position to solder. Not only for hands, but many other little hard soldering jobs its use is important. To resume the spectacle subject. It is common in the repair of bows for solder to accumulate in the groove, and to remove it with any hand tool is difficult and tedious, but if we have a little rotary cutter for our lathe the job is



no way difficult. Such a rotary cutter is shown at *D* fig. 2. A simple brass chuck *B* screws into the lathe spindle at *f*. Into the brass chuck is inserted a steel pin *h* with a screw. The outer end is turned as an arbor to receive and hold the cutter *D*. At *g* is a nut which holds the cutter *D* in place. The cutter *D* is simply a disc of steel about $\frac{1}{2}$ of an inch thick, and can be made of a large thick steel ratchet wheel. After rounding the edges, it is not a very difficult job to file one into teeth with no guide but the eye. The edge *i* of the cutter is run along the groove where the glass goes. The manner of holding the work and managing the cutter will suggest itself to the reader. It is, of course, understood that in making the cutter the filing and turning is done when the disc *D* is soft; then it should be hardened in oil, which gives toughness as well as hardness. In soldering broken gold temples it is well to make the joint as shown in fig. 3; it is stronger than merely butting the ends together and more easily held than a lap joint. The writer spoke some few numbers back of making joint screws for spectacles. This course has many advantages, and is even an economy in point of time, especially in repair of gold specs. About three sizes of screws will enable one to replace any gold joint screw; not with a half fitting make shift but a reliable satisfactory job. Making of spec screws on a small scale is not such a fearful bugbear as some workmen imagine. If one has an American lathe which will take wire large enough this certainly is the quickest; but with a geared hand drill screws can be made quick enough to satisfy almost any person. I will first speak of making screws with an American lathe, then describe a method where only a hand drill is used. Good iron wire answers every purpose for spec screws, and it works much better than steel. Select a piece of Stub's steel wire of the size we desire for the head of our screws and put it in a split chuck of the proper size, center it with a graver and drill a hole in the end of the size we desire our screw blanks. Such a piece of steel wire is shown at diagram *H** with a hole drilled at *m*. The end of the piece *H*

should now be filed into teeth as shown at diagram H^{**} , which is an end view of H^* . At fig. 4 is shown the device complete. Here we have the back end of H tapered off at k and set in a handle L . Sliding on H is a steel band or sleeve j . In making screws we put a piece of wire I into the split chuck N , fig. 4, letting it protrude enough to form the screw head, and also room to cut it off without marring the split chuck. We now move the sleeve j forward until it is at the dotted lines to guide the hollow drill H in centering the wire I . As soon as a secure hold for the cutter H is established on I , we slide the sleeve j back so the chips from the hollow drill can be freed and thrown off. Plenty of oil must be used. A few seconds and a screw blank will be formed, although not running exactly true when in the lathe, will be found all right for use as the sleeve j centered the wire I at the outset. We now must cut the screw. An old pair of Stub's cutting pliers annealed, and 3 sizes of screws tapped into the jaws as shown at III , fig. 5, after hardening, makes a first-class screw plate. The wire is grasped as shown at diagram R^* and the lathe spindle turned backward and unscrew the screw we are cutting out of the jaws; repeating this motion two or three times we have a beautiful thread on our screw blank t . The cutting off is done with a saw at s , fig. 4. For slotting the heads we put a screw into the old cutting pliers we used to cut the thread, and place them in our bench vise as shown at diagram R^{**} , where V represents the bench vise, R the pliers, u the screw head to be slotted; r is a guide or gauge to enable us to saw the slot exactly in the center of the screw head; it is simply a piece of steel about $\frac{1}{4}$ of an inch wide, and, say, 2 inches long, with a recess at y to receive a little less than one-half the screw head. To make one we take a piece of soft steel of the dimensions just given above, only it extends to the dotted outline beyond y . We next make a recess with one of our rose drills or countersinks described in former article for recessing for screw heads of spec screws, or we can use the hollow drill H , fig. 4, by starting with a taper drill as shown at H , diagram r^{**} , until we establish an opening for the hollow drill H . After a recess is formed which is deep enough to hold nearly the whole screw head, we cut away the part shown at the dotted outline in diagram r^* , and use the end for a guide to our saw s for slotting. The better way is to make up two or three dozen screws, then slot the heads one after another. It will not take but a short time to make a quarter gross of screws, and then with a good tap to open out the old joint in the specs we know our job is solid, and no fussing and picking with strong temptation to rivet a screw if it does not hold. By having a brass chuck, as shown at fig. 6, fitted to our lathe with a burnish file we can polish the heads as nice as we please. If the screws are made of iron wire we can easily case harden them by putting a lot into a recess made into a piece of charcoal, and heating them with some pulverized yellow prussiate of potash for 15 or 20 seconds; then throw them into cold water. They will be found with a white hard coat of steel all over the outside, and, if we are not too particular, they can be blued directly from the hardening; but if we wish something nicer, put them into fig. 6 and give them a polish with a slip of boxwood and diamantine. Have 3 sizes of No. 6 to match the 3 holes in fig. 5.

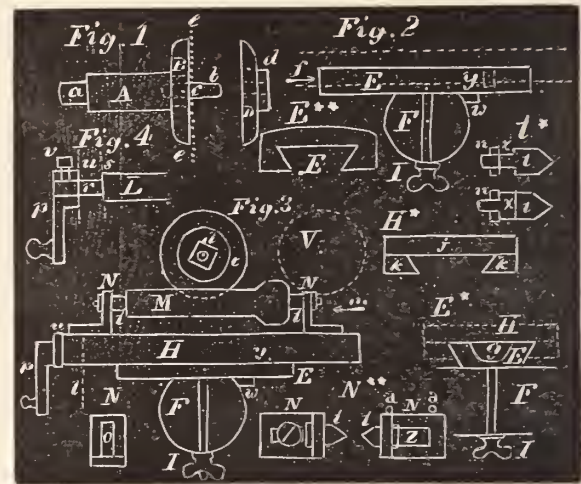
Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.



THE ARRANGEMENT for splitting the chucks into 3 equal parts is next in order, and the first essential in this is the saw. We mount our saw on a chuck or arbor which goes into the spindle of our lathe. The chuck A is made of pieces of large hard brass wire, with the pin a tapped to go into the lathe spindle. At B is screwed on a button about $\frac{1}{2}$ an inch in diameter and $\frac{1}{8}$ thick, and

shaped as shown; this serves as one of the cheeks for holding the saw. The pin b is of steel spring tempered; one end is screwed into A while the other protrudes as shown. The larger part c , next the cheek B , is turned plain and smooth, while the smaller part b is tapped to fit the nut d and clamp the saw between B and D . The saw which goes on the dotted line e can be made of a piece of wide French clock spring or it can be bought. The saw should be about 1 inch in diameter and as thin as practicable. My advice is to buy about 2 saws to commence with. The device for holding the chucks for splitting must be made, but it is not difficult or expensive. It consists first of a bed 2 inches long, $\frac{3}{4}$ of an inch wide and $\frac{3}{8}$ thick. This is made of cast iron. At fig. 2 this bed E is shown as seen looking in the direction of the axis of the lathe. The lathe bar is shown at F , and the screw and nut which hold the bed E to the lathe bar F at I . The attachment is very similar to a slide rest, and by adding a few other parts would serve for this purpose. Diagram E^* is an end view of E seen in the direction of the arrow f . The dotted



outline gives the form of the slide H , which goes on above E , for holding the chuck to be split. The piece E is grooved at g , as shown in diagram E^* , for receiving the screw which moves the slide H . The way to make E is to prepare a wood pattern $\frac{7}{8}$ wide, $2\frac{1}{8}$ long, $\frac{1}{16}$ thick (with a groove like g), and have it cast in iron. Cast iron for such purposes is much better than brass, as it files and fits easier and is more rigid when done. In having castings of this kind made it is best to have one or two extra pieces of each part cast, as one can hardly foresee the accidents which may happen. In fitting up such pieces as E , the reader might imagine that he could hardly do it without expensive machinery, like an iron planer or a milling machine. Now, to such I would beg to say that with only a perfectly true flat surface like a plate of glass, a skillful man will more perfectly fit such parts than any machinery in existence. For roughing out E after it is cast, we should make a templet G of about No. 20 sheet steel, the notch at E being shaped exactly as a transverse section of the bar E . The first thing to do is to make the upper surface of E perfectly flat and true. This the reader has already been instructed how to do by filing and scraping, and testing on the roughened glass slab. The angles at $h h$, diagram E^{**} , should be 60° . In fitting up E , as remarked above, we make first the top flat, then our edge straight and at the proper angle (60°); then make the opposite side so the piece E will slide through the templet and just touch from end to end. The whole device is shown in fig. 3, seen precisely as in fig. 2, except the additional parts are shown. The slide H which works on E consists principally of 3 pieces of cast iron; the main piece j is $4\frac{1}{4}$ inches long, $1\frac{3}{4}$ wide and $\frac{1}{4}$ thick. In making the wooden patterns for these parts, $\frac{1}{16}$ of an inch should be allowed in all widths and $\frac{1}{8}$ in length for fitting and shrinkage. At diagram H^* is shown a transverse section of the slide H on the dotted line l , fig. 3, showing the 3 pieces spoken of above. The largest piece, j , I gave the dimensions of above; the smaller pieces, $k k$, are $4\frac{1}{4}$ inches long, $\frac{1}{4}$ thick and $\frac{1}{2}$ an inch wide where they meet j . The lower surface of j is filed and scraped perfectly flat and true, and

fitted to match the upper surface of *E*. The pieces *k k* are attached to *j* with 3 screws each. The upper surface of *j* is filed approximately true and parallel to the lower face, but extreme accuracy is not needed in this case or in the finishing of the lower surface of the pieces *k k*. Screwed to the upper surface of *H* are two L-shaped pieces *N N* for holding the centers supporting the chucks to be split. One of these L-shaped pieces is shown separate at diagram *N**, as seen in the direction of the arrow *m*. It has a slot *o* which enables us to move the centers *l l* up and down so as to set our chuck properly for splitting. The centers *l l* are made of steel wire about 1/4 of an inch in diameter. Two views of one of the centers *l* are given at diagram *l**; the upper one is a top view and the lower one a side view; the flattened part *x* goes into *o*. At *n* is a nut for clamping the centers *l* tight when in place. At *p*, fig. 3, is shown a crank, and attached to the crank is a screw which lies in the groove *g*, diagram *E**. This screw can be cut with the same dies which cut the thread on the chuck for engaging with the drawing-in spindle. The wire from which the screw is made should be about 4 1/2 inches long, and the end where the crank goes turned down, as shown at *r*, fig. 4. This view is enlarged from most of the others in the cut, and is supposed to be seen in the same direction as fig. 3. At *u*, fig. 3, is shown the edge of a plate of brass screwed to *H*, and through this the turned down part *r* of screw *L*, fig. 4, works. The idea here is: the crank *p* slips onto *r* and is fastened with a set screw *v*, so that when the screw *L* is in place it is held from moving endwise by the plate *u*, fig. 3, acting alternately against the shoulder *s* (fig. 4) and the crank socket as shown. Now, as the screw is connected to *H* at *u*, if we place a nut at about *y* (this letter is shown in position in fig. 2, and is indicated by the dotted line extending from the letter in fig. 3) through which the screw works and turn the crank *p*, the slide *H* will be moved back and forth. At *w*, figs. 2 and 3, are shown a guide for setting the piece *E* at right angles to the lathe bed. The L-shaped pieces *N* are capable of being moved on the piece *j* for adjusting the chuck *M* to be split. At diagram *N*** the L-shaped pieces are shown as if seen from above; at *d d* are two pins which serve to hold one L-shaped piece in line while a chuck to be split is inserted. In the slot *z* goes a screw which holds *N* in place. It will be seen that the piece *w*, figs. 2 and 3, ensures our setting the slide *H* at right angles, and by means of the screw *I* we can set slide *H* exactly under the saw, and by means of the perpendicular slots in the pieces *N* we can set the chuck to be split at just the right height to split. The splitting of chuck should extend into the hollow-bored-out-part, but should not separate the end which is to grasp the job ultimately turned in the chuck. The final separating will be explained at our next interview. The dotted outline at *V* shows the position of the saw when ready to cut.

The Stopwork.

[BY M. GROSSMAN.]

Continued from page 178.

REMARKS ON THE WATCH TRAIN.



R. GROSSMAN'S remarks on the watch train having until now been crowded out by other matter, is resumed as follows: There remains, he says, a word to be said on an improvement of recent date. It has already been mentioned that the center pinion and the barrel are in constant danger of having their teeth bent or broken by the sudden jerk of a breaking mainspring. These accidents are so troublesome that a number of little contrivances have been made in order to avoid them. It will not be useless to give a look and a thought to these insulations, and to consider whether they are really what they ought to be.

For watches of a diameter of 43 millimeters (15 English or 19

line Swiss) or more, a train with pinions of 12 is highly recommendable, but only under the supposition that the utmost care can be bestowed on the correct pitching and rectifying of the depths. The following would be a suitable arrangement for a train of that kind:

| | | | |
|--------------------|------------|--------------------|----|
| Barrel..... | 105 teeth. | Center pinion..... | 14 |
| Center wheel... 96 | " | " | 12 |
| Third wheel... 90 | " | " | 12 |
| Fourth wheel... 80 | " | " | 8 |
| Escape wheel... 15 | " | | |

The resulting size of teeth are:

| | | |
|-------------------|-------------|-------|
| Barrel..... | Millimeters | 0.30 |
| Center wheel..... | " | 0.24 |
| Third wheel..... | " | 0.22 |
| Fourth wheel..... | " | 0.216 |

There is one of these precautions consisting of a kind of elastic transmissions on the third wheel. This wheel is fitted with a collet, loose on the pinion, which carries a disc riveted to it. On this disc is fastened a spring with a perpendicular arm, which extends toward the third wheel, and reaches the arms of this wheel with its aid, thus carrying the wheel with it while the watch is going. The end of the arm has a slight slope, and when the spring breaks it is expected to slip over the arm of the wheel by the violence of the shock, and thus to stop it. I should not advise the use of this safety apparatus, because I think it will fail by the inertia of the parts between the third wheel and the mainspring. The destruction, by a sudden jerk, will be completed before its power reaches the third wheel, in a like manner as the blasting-powder in a hole made in the solid rock and stopped up with a little clay will split the rock by its sudden action before it has time to drive out the small stopping. Besides, this arrangement, if it should have any chance of success, must have the spring exactly regulated, so that it does not yield to the pressure of the mainspring, when fully wound, but that any pressure beyond this will make it slip over. If this be not the case, the safety of the center pinion will not be attained; and, if it be, any excess of pressure, by inconsiderate winding at the end of the operation, will make the spring run over, and the result of this would be a deviation of rate. Now, I think, the wearer of a watch will find an irregularity of its performance a fault of a much more grave character than an occasional accident which he knows to be out of connection with the timekeeping of a watch.

Other contrivances promise better success, because the regulating resistance is in the center pinion. This latter has a rather large hole, and is adjusted on a staff or axis, to which the wheel is riveted, the pinion being held fast on the staff by a screw nut and a washer. This pinion, if it is set in motion, performs like a solid one, owing to the frictional resistance which keeps it to its staff being a little in excess of the strain effected on it by the moving power; but any addition to this strain causes the pinion to move independently of its staff, and thus to counteract the strain without injury to any of the acting parts. It will be readily understood that this disposition protects the center pinion and barrel teeth not only against the sudden shocks of a breaking spring, but also against any unequal strain in winding, and all this without any alteration of the time shown by the watch.

However, this contrivance has also its weak side. The center pinion, with its large hole, especially when it is of a lower number than 12, has too little stock left between this hole and the bottom of the leaves, and thereby the solidity is endangered from another side. Therefore, it will answer in the case of a watch the hands of which are set at the front, but it will hardly do for the hollow center pinions used for setting the hands on the back.

Some years ago I had in hand a similar safety center pinion of English make, also with a staff on which the pinion was screwed with a three-headed screw. Tapped into the hole of the pinion and a cut on the staff, this screw—which must be a right-handed one if the center wheel is above the pinion, and a left-handed one if it is below

the pinion—is kept tight in the ordinary course by the pressure of the motive power. But when a backward shock is applied to the pinion it unscrews, thus obviating any injurious effects. This, though it appears very effective, is still open to several serious objections. The additional strain at the end of the winding operation is not counteracted, but tends to screw the pinion still closer, so that it is doubtful whether, in case of emergency, it would break or unscrew, especially considering that the pinion itself, by the large dimensions of its hole, is rendered rather frail. Besides this, there is no saying from which side the shock of the breaking spring will come. If the spring breaks near its outer end, the shock will apply in the way of the regular tension of the spring, and the safety apparatus will be of not the slightest use; on the contrary, the pinion weakened by the large hole will stand a poor chance. It will only be effective in case of the spring breaking near its inner end.

There is a general demand for anything effecting a guard against accident to the center pinion, and every thinking manufacturer ought to make this an object of his reflections. Still, it seems the right thing is not found yet.

The best contrivance is certainly that of adjusting the pinion on a round and slightly taper staff, and to hold it fast by a screw nut and washer; but it has the objection of diminishing solidity of the pinion itself against it.

I never felt tempted, however, to apply it to any watch of my own manufacture, as I believe there is a plainer way of attaining the purpose. First of all it will lead in the direction of having, by observation of the preceding principles concerning barrel and train, a main-spring of comparatively great length and little thickness. In case of breakage, the shock resulting from it will be less injurious, and in winding it the interposing of the stopwork will be more readily felt than with a strong stubborn spring. Secondly, I think it advisable, and practically possible, to strengthen the leaves of the center pinion and barrel by giving them a shape more appropriate to their functions. Whenever one of these teeth is broken, the fracture invariably takes place at the bottom, where it is thinnest, and has two sharp corners, required by the taste of the great majority of watchmakers. An alteration of this would give the leaves about double their strength by making them round at the bottom, without interfering in any way with the service of the parts. I feel persuaded that the general employment of this form for the leaves of the center pinion would serve the purpose well, though it is not pretended that a complete guarantee against fracture would ensue from it; but in this point all the other contrivances are equally doubtful.

THE MOTION WORK.

There is not much to say about the construction of this part of the movement, because it is, to a certain degree, independent of the proportions of the train. In Swiss watches the motion works are generally much smaller than there is any necessity for making them. With the employment of the free springs, however, there might be some advantage in very small motion works, because the barrel heads of that kind have no shoulders allowing the necessary space for the hour wheel.

There are some trifling matters in the motion work open to reform. In English watches, even of the better makers, the minute wheel moves mostly on a brass pin, driven rather carelessly into the pillar plate, an execution altogether unworthy of the character and general workmanship of these watches. The Swiss watches, on the contrary, down to their lowest qualities, have invariably a screwed staff on which the minute pinion is adjusted. These staffs are not easy to make, inconvenient to take out and screw in again, and by the tapping of the hole in the plate, they offer less reliability to a true pitch than a round hole drilled on the pitch circle. I think there is a way between these two which is easy of execution, and irreproachable as to solidity and diminished friction. A hole of the same size as that in the minute pinion is drilled through the pillar plate on the pitch circle; a good round and well polished pin of hard steel, rounded at

both ends, is driven into this hole, even with the plate at its inner side, and projecting on the other side till it nearly touches the dial. The minute pinion has a small projecting canon left beyond the riveting to hold the minute wheel at a little distance over the plate.

There is another matter which might be improved. It is the way of adjusting the minute hand to the canon pinion. In almost all Swiss watches the hand is adjusted on the end of the setting staff, and therefore it is necessary to support the setting square when putting the hand on, lest it should come out of its place by the pressure. This is not the case when the hand is adjusted on the extremity of the canon pinion, which has a shoulder for this adjustment. Beside, this arrangement affords the advantage that the end shake of the hour wheel can be regulated between the face of the canon pinion and the lower end of the canon of the minute hand, thus dispensing with the small spring commonly in use for keeping the hour wheel steady in its place.

It remains only to say a few words concerning the setting of the hands, which in most cases is done from behind in Swiss watches. The setting of the hands on the dial side is an inconvenience almost inseparable from the nature of a full plate movement, but in three-quarter plate and bridge frames there is not the slightest necessity for it. The gradual abandonment of the old plan of cases with fixed domes and the movement accessible only from the dial side, brought the reform of the way of setting the hands with it.

THE ESCAPEMENT.

It cannot be the object of this treatise to describe and illustrate the various escapements, or to discuss their relative merits. We have merely to occupy ourselves with the exterior parts of construction, which serve to bring the escapement in its place, and to keep it steady there.

(To be continued.)

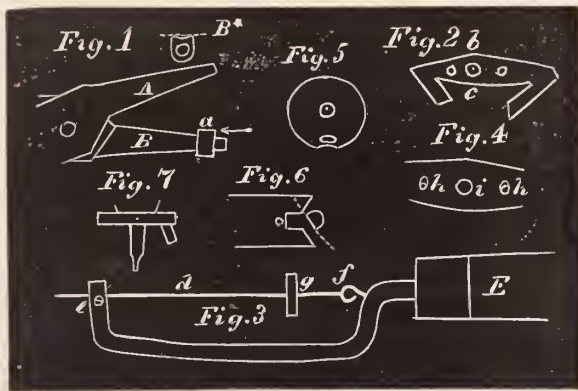
Problems in the Detached Lever Escapement.

BY DETENT.



AFTER THE fork and pallets are joined, as described in last article, and we try them in the watch, it may be one pallet looks a little deeper than the other; to remedy this we can bend the fork between the guard point and the pallet. To do this we make a little device which we put on one jaw of our round-nosed pliers. It is simply a small piece of steel with a hole drilled and broached out to fit one of the plier jaws as shown in fig. 1, where *A B* represent the two jaws, and *a* the piece of steel. At diagram *B** the piece *a* is shown as seen in the direction of the arrow. The lever fork to be bent is placed at the dotted line, and the other jaw of the pliers will readily bend the fork to our wishes. Sometimes we find pallets faulty in depth, either too deep or too shallow. To remedy this we must grind the hole through which pallet staff passes to one side. If the depth is too great we grind the hole on the side *c*, fig. 2; if not enough, on the side *b*. We have to grind the hole in the pallets because they are invariably hard, and we cannot soften them without injuring the shellac which cements in the pallet stones. The instrument we use is a bow of steel wire about $\frac{1}{16}$ of an inch in diameter and bent as shown at fig. 3, where *D* represents the bow of steel wire and *E* a handle. At *f* is a loop screwed into the wire *D*, and at *e* the wire *D* is split and a screw put through as shown. At *d* is shown a fine iron wire which is attached at one end to the loop *f*, and the other passes through the split in *D* and is clamped by the screw at *e*. To use this device we select a piece of iron wire (generally bending wire) of about the size of the hole in the pallet staff and put it into *D* as shown. We slip the pallets on the wire *d* as shown at *g*, and apply oil and oilstone dust to the soft iron wire *d* and use the instru-

ment as a saw, pressing the wire *d* to the side we wish to cut away. Two or three applications of oilstone dust and oil will soon grind a hole to one side. After the hole for the pallet staff is ground over enough, the holes for the steady pins in the fork is to be ground to one side in the same way, only using a smaller wire for *d*. The pallet and fork, if the work has been done carefully, will still be sufficiently secure, as will be seen on inspection of fig. 4, where a portion of a fork is shown, *i* representing the pallet staff and *h h* the holes for the steady pins. Of course, *i* has not been disturbed, and in this instance we will suppose we are moving the pallets in to correct a shallow depth. The holes *h h* are ground oval as shown, but if the grinding has been done equally, the steady pins rest securely on the same side of the lever; consequently the pallets are held from tilting when the pallets are screwed fast by the screw on the pallet staff. It often happens a roller is not round, and if we set the guard pin so as to stand free of the roller in its entire circuit it will shift and over-bank. But let us consider this problem a little. Rollers are usually made true and round, and, if not so, the trouble is generally the result of some unskillful workman's tinkering. If a roller *seems* out of round because the balance staff has been pivoted, and the pivot



does not correspond to the center of the staff, don't spoil the roller to correct another fault; re-pivot the staff or put in a new one. But if the roller has been filed off on one side to allow the guard pin freedom, so the roller runs comparatively true on the *untrue* staff, correct your pivot all the same and then correct the roller. If the watch is a fine one put on a new roller; if not, use the old one if not too badly injured. The tinkered roller, after being filed on one side, seems out of round; and so it is, but to correct it so we can use it is what we desire to do now. At fig. 5 is shown a roller, and it has been filed away (we will suppose) from the opposite side to the jewel pin. To correct this we take the device shown in fig. 3, and grind the hole for the staff over toward the jewel pin. The hole for the staff is now too large, but we close it with a small round faced punch. The punch must be adapted to the job, and should be only about twice the size of the staff at the point where it is rounded to a ball. Judgment should be used to not grind the hole over any more than necessary. But a few practical lessons will soon put one right. Of course, the roller is not exactly true, and neither are *all* the rollers in new watches perfectly round. But if care is taken the guard action will be safe, and that is all we can get in any roller. It has been the writer's study in these problems to deal with practical questions and suggest remedies for actual faults and defects, and he does not believe he can further this aim more effectually than to describe a real case of watch sickness which came recently under his observation. He (the writer) has, in addition to other work, the charge of the watches used by the engineers of a long line of railway. The company furnishing the watches and keeping them in repair for their employees. Occasionally a watch falls into the hands of some outside workman, as in this instance. The engineer having the watch in his possession dropped it, and rather than incur the suspicion of carelessness, took the watch to a jeweler to be repaired at his own expense. About a month since it came from the company's agent with the complaint it did not keep time. On examination it was found a new jewel had been inserted in the lower fourth wheel pivot

hole. The jewel was not set in the plate, as the bezel for holding it had been broken up in trying to open it, and a jewel had been put in and imperfectly fastened by cutting strong heavy bars with a graver. But the jewel was not either securely fastened or in the proper position, as it threw both the third and fourth wheels out of depth. The watch (an Appleton, Tracy & Co.) stopped, and the man who tinkered it fancied the trouble was in the escapement and went at it to put it to rights in his way, and the result was the watch was thoroughly and completely demoralized. The entrance pallet had been drawn out too far, and this led the man to think that the pallets were too close inside, and instead of pushing the pallet back where it belonged, he pushed the exit pallet away until it had no draw to the lock on this pallet. This compelled him to open the banking on the entrance pallet too wide. Here another trouble beset him in roller action; the jewel pin did not properly enter the fork, but struck it as shown in fig. 6. To remedy this defect he set the jewel pin as shown in fig. 7. The first thing to be done, of course, was to put a new jewel in for the lower fourth wheel pivot, and, as the jewel setting was destroyed, the jewel had to have a separate setting, the same as the jewels are provided with in the top plate. It is not exactly consistent with the title to these articles to take up train jobs, yet it is important that *all* the wheels "go round" before we doctor the escapement. Such jobs not unfrequently turn up, and it is well for the young and inexperienced workman to know how to treat them.

Reminiscences of Chaux-de-Fonds.

Continued from page 228.



IN ORDER to follow the fortunes of the Droz family, we were compelled to pass into the nineteenth century, but so as to resume the regular chronology of our history, let us return to the eighteenth. The unlooked-for success of the watch industry had not alone infused new life into the inhabitants of Chaux-de-Fonds, but it had also kindled in them an ardent desire for progress and improvement, not only of the industry proper, but also for their political, social and religious conditions. As leader of the latter movement we find the very erudite and at the same time very heterodox pastor, Ferdinand Olivier Petitpierre, who, contrary to the then universally received opinions, denied the eternity of punishment for sins, both by preaching and writing. The contention became so heated that Petitpierre had to resign his pastorate in 1762, and was expelled from Chaux-de-Fonds. A petition was forwarded to Frederick the Great to have him reinstated, but this liberal-minded monarch laconically replied: "Si wes bienaimés et fidèles sugets de Neuchatel veulext absalument etre condamnés a perpétuite qu'a moi ne tienne."*

These religious views became weighty by the fact that the doctrines assailed were those universally believed in; Chaux-de-Fonds was steadily growing in importance, and it was feared that the free advocacy of heretodox principles might injure its reputation. Not only the people of the surrounding villages, but strangers from foreign countries, flocked in large bodies to the rapidly-growing village, in order to either learn or perfect themselves in the art of watchmaking. Geneva sent many of its best citizens; in 1782, the progressive citizens' party of this city succeeded in overthrowing their old aristocratic government; this, however, found support in Bern, France and Sardinia, who assisted in restoring it, and in punishment for their rebellious spirit the inhabitants of the city were oppressed worse than before, in consequence of which many of them left and went to Chaux-de-Fonds, where they, nearly all of them being watchmakers, were able to pursue their vocation peacefully. It is evident that owing to this constant influx the republican spirit of

*If my well-beloved and faithful subjects of Neuchatel absolutely have a desire to be damned it is no concern of mine.

the population predominated largely, and made itself felt at the first breaking out of the French revolution, when it turned against the Prussian Government party. Although this republican spirit was apparently suppressed among the mountaineers, who had everywhere erected liberty poles in commemoration of the event, still Chaux-de-Fonds has henceforward remained the center of republicanism, and the headquarters of the Neuchatel liberals—a reputation which it has preserved spotless from that time to the present.

It would be wrong, however, to suppose that at that time this mountain village bore in its architecture and institutions the imprint of a city, such as it is to-day. Chaux-de-Fonds had, in spite of its rapid growth and its accumulating wealth and industrial development, remained to be a modest village, which the visitor, unacquainted with its importance, would never have suspected to be the seat of a remunerative industry. But those who were cognizant of those facts saw with pride that these skilled workmen, in spite of their large income, remained satisfied to live in the old simplicity of their ancestors.

Suddenly, on the early morning of May 5, 1794, fire broke out in a warehouse in which a large quantity of both powder and oil was stored, and all attempts to subdue the flames were unavailing, when finally the powder ignited and scattered the firebrands over a large area, thereby igniting twenty buildings at once. The fire, fanned by a strong wind, spread with an irresistible rapidity over the entire village, so that of eighty-nine houses, constituting Chaux-de-Fonds at that time, sixty-two became a prey to the flames in less than three hours, and more than three thousand people were without a shelter.

Donations flowed in from all quarters, both far and near, and large sums of money were collected. Even several years afterward two of its citizens named Bourquin gave to Chaux-de-Fonds, their native village, the sum of 92,000 francs, and the place was quickly rebuilt, not in its former style of lowly huts with shingle roofs, but it was laid out on a modern plan, with wide streets and squares, and modern houses with tile or slate covering, and the rapid development of the place henceforward is marvellous. The conflagration was attributed to party hatred.

Prosperity no less than adversity develops character, and we at this time meet with a man, Frederick Alexander Courvoisier, who assisted mightily in the development of Chaux-de-Fonds, where he was born in 1799. Having received a careful education, first in Geneva and then in Couvet, he went to Basle, where he witnessed with great zest the two sieges of Huninger (1814). He was brave to rashness, and once he and a number of other young men from Chaux-de-Fonds, residing in Basle, formed the plan of drifting in a boat on the Rhine down to the place during night-time to carry provisions to the besieged. From Basle he returned to Chaux-de-Fonds, where he acquired the art of watchmaking, and then went to live with his father, who sent him as the representative of his firm to Lisbon, next to Livorno, Florence, Rome and Naples. After several years of absence he returned, and was elected to several positions of trust. He advocated the separation of Neuchatel from Prussia, and joined the People's party, which, under Alphonse Bourquin, of Corselles, forcibly seized the reins of independent government. The enterprise, however, was not favored by the home government, and Courvoisier, in common with a large number of patriots, was compelled to leave Chaux-de-Fonds and retire to Basle, and only after several years of expatriation was he permitted to return home. After this miscarried undertaking he joined his brothers, and together they carried on the extensive watch business in Chaux-de-Fonds established by their father. In 1836 he was so unfortunate as to lose his wife by death, and he then commenced to travel extensively in the interest of the firm—sometimes in Italy, then to Egypt, Greece, Turkey and Russia. He established commercial relations in Turkey, and opened a branch in Madrid. He always brought home with him rarities and curiosities, which he presented to the museums of Berne, Neuchatel and Chaux-de-Fonds. He

finally, in 1839, separated from his brothers and opened a watch business, which quickly assumed large proportions, in Chaux-de-Fonds. He was incessantly occupied in doing charitable acts to his fellow-citizens, and public elemosynary institutions were always remembered by him. Among other establishments he can justly be called the principal founder of the handsome hospital at that city, and served for many years as its treasurer; his disinterestedness as governor of the commonwealth is still remembered and honored by his fellow-citizens. After having served his country in various capacities, and honored and respected by everybody, "Pere Fritz," as he was reverently called by everybody, succumbed to a stroke of paralysis, December 10, 1854, and not less than five thousand persons followed him to the grave.

We pass over a short biographical sketch of another renowned Swiss watchmaker, Jacques-Frédéric Houriet, born in 1741, in Chaux d' Abel, in the Franche Montagne, who became the founder of chronometer making in Locle. His brother-in-law, the great Danish horologist, Urban Jürgensen, embodied his theoretical researches both into practice and writing, in the publication of his distinguished *Principes généraux de la mesure du temps*. His son became the head of the largest firm of chronometer makers, of which his grandson, J. Jürgensen, the vice-president of the Swiss Society of Natural Philosophy, and member of the French Legion of Honor, is superintendent.

Our author next speaks at large of the almost total destruction of Locle, 1833, by fire similar to that of Chaux-de-Fonds, in 1744, and then says:

Returning to Chaux-de-Fonds, we must mention two men who earned great fame in the field of industry. The visitor to this city, about forty-five years ago, after having inspected the vast counting-houses of an Ami-Sandoz, a Robert Brand, or Courvoisier Freres, and after having been told of the marvellous extension of their watch business all over the entire earth, and after having inspected the numerous large ateliers of the engravers and engine makers, would most assuredly not have missed a visit to the venerable old artist, François Ducommun. It can be truly said that this watchmaker, although dead forty years ago, "still liveth," especially in the memory of the poorer population of Chaux-de-Fonds. He manufactured small pendulum clocks, with which he actuated the revolution of the planetary system with a rare talent and perfection. His works, similar in many respects to those of Jaquet-Droz, are distinguished by their delicacy of execution, their pleasing shape, and their great strength. His most celebrated work, however, is a planetarium, at present in the Orphan Asylum of Chaux-de-Fonds. It is specially worthy of mention that it was not alone made by him, but that he also himself made all the very intricate calculations for the mechanism. A celebrated traveler, who in 1837 paid a visit to the aged artist, then over seventy years old, gives the following description of this art-work: "In the center of the room I saw a low platform, upon which stood a globe painted in the color of the African sky. Upon the exterior surface of the globe, of a diameter of about four feet, were represented the constellation, painted by Charles Girardet. At a sudden the northern hemisphere was by a cord and pulley raised up to the ceiling, and the interior of the globe stood ready for my inspection. It contained a marvellous mass of mechanism, all of metal, which was actuated by crank motion. The sun, moon and earth were represented by metallic spheres, and performed their evolutions, as astronomy tells us. Although the artist was kind enough to explain to me the performance of the various parts, and their relations to the wheel work actuating them, I must candidly confess that I stood like the Grand Inquisitor at the explanation of Jaquet-Deoz—I understood but little of it."

François Ducommun had constructed this artistic work according to his own ideas, and for the purposes of charity. He charged a fee of one franc for showing the work, the money to be devoted to

charitable purposes, and he was able to pay over to the poor many thousand francs.

The other artist, Charles-Frédéric Racine, a painter of dials, also lived in Chaux-de-Fonds in the beginning of this century, and was engaged in miniature and enamel painting. His works are simply marvellous, and the delicacy and elegance of his paintings, inscriptions and ornamentations are unrivalled. One of his greatest artworks, which is still preserved in his family as a cherished specimen of the artist's skill, is a small dial, of about six lines diameter. At first glance the observer will simply discover upon it several fine circles, and barely noticeable hair-like lines; every endeavor to discover any relation to each other is in vain, and only by the use of a strong magnifier will these lines assume proportions. Upon the small dial are seen very plainly four other dials still smaller—making five in all: One with the hours and sixty minutes, the second with the dates, the third with the twelve months and their numbers, the fourth with the days of the week and the planets, the fifth with the sixty seconds. The five hair-lines, barely discovered with the naked eye, become legible lines. The dial to the left contains the following words:

“Un nouvel univers à nos yeux se découvre,
Quand on sait enlever le voile qui le couvre.”†

The dial to the right contains:

“D'infiniment petits un monde merveilleux,
Prèsente dans un point et la terre et les cieux.”‡

By closely studying the seconds dial upon the lower end, we read:

“De cet étroit cadran je ne fais pas un tour,
Qu'on ne voie un mortel s'en aller sans retour.”§

The upper dial bears the name of the artist: “Fait par Charles-Frédéric Racine-Hanic, de la Chaux-de-Fonds, canton de Neuchatel, en Suisse, 1821.”

We then turn to the circle, barely visible by the naked eye, close around the edge, and behold: it has turned into letters grouped into the words of the entire Lord's prayer!

This is literally true. This small dial, with its appropriate numbers, figures, lines and Lord's prayer contains 605 letters perfectly distinct, yet so minute that they do not cover more than one-thirteenth part of the surface. In order to fill this entirely the artist could have written the Lord's prayer almost twenty-five times on it. It has been calculated that by using such letters the entire Bible might be painted upon both sides of a sheet 105 lines in length and 105 lines broad.

The reader will exclaim, “He must have possessed an incomparable talent!” Of course, and his skill becomes the more marvellous by the fact that he executed his works altogether with the brush, without the use of any auxiliaries. He was entirely self-educated, and never had left his home. To impress the full imprint of the artist on him, he also shared their general fate by having to starve most of the time. His time-consuming artistic works were paid too poorly to lay up any money, and he was more than once in a state of starvation. He died at Neuchatel in the year 1832.

(To be Continued.)

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular:

Western jobbers in jewelry have every reason to congratulate themselves on the volume of business done during October. True, it

† A new world is opened to our eyes, if one understands to lift the veil which covers it.

‡ A marvellous collection of infinitely small things shows us in one dot the earth, together with the heavens.

§ I do not perform one revolution around this small dial but that one mortal goes thither without returning.

exhibits a considerable decline when compared with the showings of August and September, but that is a matter of annual expectation, and indicates an entirely healthy condition of the trade. The money which has come in from the crops is now circulating freely throughout the country, and jewelers have no reason to complain of the share which has fallen to them. The amount of business in watch cases and movements done by the manufacturers this fall has been unprecedented for this market, and nearly all the local manufacturers have at present more orders on hand than they can possibly overtake. Jobbers and dealers alike have felt the favorable reaction, and on all hands there is abundant expression of satisfaction and content. Never in the history of the Chicago jewelry trade have so many dealers from all the States and Territories of the great West been known to visit the city. Men had money to spend, and, desiring to combine a little pleasure with their business, have literally swarmed into the Garden City. Scarcely a jobber but has materially profited from the unlooked for influx of buyers, and it does not appear to have interfered in the least with the ordinary business done by travelers, for nearly every large house has had a most encouraging pile of orders sent in by its men on the road. Collections have corresponded well, in their greater ease and promptness, with the improvement in business, and there are at present vastly fewer dealers “begging off” than some little time ago. It is now no uncommon thing to hear large jobbers, who have been figuring up the last few months' business, declare that their August trade was fully 40 per cent., and their September trade quite 25 per cent., ahead of the figures for the corresponding months of last year. The business for October will, at the least, fully maintain the standard of the previous year.

It is interesting to note the vast progress that Chicago is making as a diamond market. Her buyers are to be found in all the leading marts of the world, and not a few of the important jewelry jobbing houses are quietly working up a diamond department in their business. It is also to be noted that the demand here is almost exclusively for the finer quality of goods, and such may also be said for the demand from the country. Such firms as F. E. Morse report unusually heavy sales of the finer class of goods, and all jobbing houses engaged more or less in the trade can give encouraging showings.

Great activity, as has been indicated, is to be observed all through the manufacturing part of the business. Among local manufacturers the Towle Manufacturing Company is worthy of recognition. It is now doing an excellent and rapidly increasing business in sterling silver and fine electro-plate ware. Its line of patterns known as “Orchids” promises to become very popular. Wendell & Co. are working extra hours with a considerably increased force of workmen, turning out as rapidly as possible their beautiful new line of watch cases. The Blauer Watch Case Co. is also exceptionally busy on its gold and silver watch cases. The firm's invisible joint case, which has hitherto been in most demand in the East and Canada, is coming steadily to the front now in the West, and an increased staff of workmen is endeavoring to cope with the large orders that are daily coming in.

All the large watch case and movement firms of the country are doing an immense business through their Chicago agencies, the difficulty just now being rather to fill orders than to find customers. The western agency of the New Haven Clock Co. is finding business particularly lively at present. They have had to employ extra hands and are working nights to fill their almost unprecedented orders. The same may also be said of the Waterbury Co., which has its hands quite full.

The friends of Samuel Swartchild will be glad to hear that there is now a marked improvement in his condition. After more than two months' severe affliction with a painful internal trouble he is now able to be out of bed, and in the course of a week or two it is expected that he may be once more seen around the store where he has worked so hard and successfully to build up a business.

Benj. Allen has now taken full possession of his new and commodious quarters in the block immediately south of his former business premises, and is to be congratulated on now possessing one of the best appointed and finest furnished stores in the country. The entrance, vestibule and elevator are among the most elegant to be seen in the city, and are daily being visited by admiring crowds. Mr. Allen's new catalogue, which will be the largest he has ever compiled, will be issued about Nov. 1.

Mr. Lapp, of Lapp & Flershem, has now almost completed the new catalogue on which he has spent so much time and pains, and customers may shortly expect to have copies in their hands with their own names on the cover.

Mr. Alister, the genial and popular partner of B. F. Norris, has completed his handsome new residence at Kenwood, and will shortly leave Michigan avenue for his delightful suburban home. Mr. Alister is thought to have caught the building craze from Mr. Norris, who is engaged in large building enterprises in San Francisco. Mr. Norris, by the way, is reported to be in excellent health, and his partner here reports business all round to be in an exceptionally healthy condition.

R. A. Kettle, the Chicago agent for Messrs. Robbins & Appleton, has returned from his eastern trip, and is pushing for business and pacifying the jobbers in his own bright, characteristic way. Mr. Evens, the local agent for the Dueber Watch Case Co., who went up into Michigan for the benefit of his health a few weeks ago, has returned to the city in a thoroughly reinvigorated condition.

Jim Fleming, formerly foreman for the Blauer Watch Case Co., has severed his connection with that concern and gone East—some think to engineer a new watch case company.

Great satisfaction is evinced by dealers generally throughout the West at the action of the National Jobbers' Association, in offering a reward for the detection of anyone found violating the constitution of the organization.

One of the most audacious diamond robberies that has ever occurred in Chicago, was perpetrated Oct. 8 in broad daylight, in the store of Tom Donnelly, diamond broker, Dearborn street. The store in question is located close to the *Tribune* office, and many important banks and business houses—in fact, close to one of the busiest crossings in the city. In the middle of the day when the street was thronged with passers-by, a clever, and evidently thoroughly experienced crook entered the store and requested to be shown some diamonds. He had called at the store on several previous occasions on the same errand, and no hesitation was shown by the proprietor in exhibiting his brilliants to the would-be purchaser. After glancing for a minute or two at some of the gems, the robber suddenly threw a blinding cloud of pepper right in the face of the unsuspecting jeweler, and snatching up a tray of diamonds from the top of the show case ran boldly out at the door, and disappeared in the crowded streets before the victimized diamond broker could clear his eyes from the cruel irritant. No trace could be found of the audacious scoundrel though every attempt was made by the police to run him down. The diamonds were valued at about \$400.

W. A. B.

Our Cincinnati Correspondence.

To the Editor of the Jewelers' Circular :

The Cincinnati Exposition closed on the 9th inst. It has been a very successful exhibition, the attendance exceeding that of any previous year. The number of exhibitors was larger than ever, and all seemed to vie with each other in making an attractive display. The success this year is especially due to the fact that a most capable

board of management was selected, and these commanded the confidence of the people who were relied upon to make the display that should attract visitors. A great many jewelers from the adjacent towns embraced the opportunity of visiting Cincinnati, and during their stay made liberal purchases of our jewelers, who flatter themselves that they have added to their list of permanent customers.

Trade has been excellent here ever since the opening of the season, which was quite early. Most of our local jewelers visited New York and Providence earlier than usual, and, in anticipation of a busy season, they ordered liberally, which orders most of them have been compelled to duplicate. There has been an unusually brisk demand for low grade movements, so much so that certain favorite ones have commanded a premium. The higher priced movements have not been so much called for, and the supply has been maintained without difficulty.

The American Jewelry Company made a remarkably fine display at the exposition, showing a large line of Waltham watches in a fine assortment of gold and silver cases. The American Watch and Clock Company also exhibited an elegant selection of Waltham, Fahys and the Watch Case Company's goods. Messrs. Duhme & Co. had, as usual, a magnificent display of articles of virtue and bijouterie, or, "virtue and bigotry," as Mrs. Partington has it. They also exhibited a fine selection of spoons, forks, hollow ware, etc., of their own manufacture in sterling silver. These goods were greatly admired, especially by lovers of the artistic, of whom Cincinnati has an unusual number.

Mr. William Oskamp, the genial son of Mr. Clemens Oskamp—the head of one of the old time and most prominent houses in the trade—has recently returned from Europe with a fine selection of diamonds purchased at first hands for cash, which he is willing to sell at very low rates on the same terms.

The Arcade is a very busy place nowadays, and Messrs. A. & J. Plaut, proprietors of that attractive young jewelry house, seem to have all they can attend to in supplying the wants of their many customers.

The old reliable house of Clemens Hellebush is not behind any of the younger brethren this season, but has now in stock the largest and finest selection of gems ever offered to the citizens of Cincinnati. Mr. Hellebush reports his business as 30 per cent. better than last year, and greets one with his good natured smile as though no one was happier than he.

Mr. Abe Schwab, of A. G. Schwab & Bro., made a flying visit to New York recently in search of novelties for their many customers. He bought liberally and with his usual excellent judgment.

The irrepressible and only "Hermann" (Aaron), has been in politics this fall, and says he was the man who got the brother of his partner, Mr. D. Schroeder, nominated for County Judge. Aaron says it is easy enough if you only know how to work the machine, but he had rather be selling jewelry than try it again.

The Dueber Watch Case Company have commenced the erection of their new factories at Canton, Ohio. The contracts for excavating and stone work on the watch factory—which is to be occupied by the Hampden Company—were given out early in the month. The Pittsburg, Fort Wayne and Chicago Railroad Company has already constructed a switch track to the ground for the use of the builders and contractors. Some idea of the extent of these factories may be gleaned from the fact that 6,000,000 brick and 10,000 lights of glass are to be used in their construction. The Dueber Company reports the greatest volume of business this season that they have ever enjoyed. With all these reports of good trade, that are unanimous in the jewelry business, the beauty of it is that all those who so report give it as their opinion that it is going to continue active right up to the holidays. Dealers will then want a little breathing spell and time to get in new stock,

H. M. B.

Cincinnati, Oct. 20.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

THE CLOCKMAKERS AND MR. CROSSMAN.

To the Editor of the Jewelers' Circular:

I must beg a few lines of your valuable space to reply to the communication of "Horologist" in the September number. I first have to thank him for his complimentary remarks, and take occasion to say in this connection that if he will notice the title of the articles he will see that "clocks" are included as well, and if he will be content to wait a few months, he can also see what we have to say on that subject. Should I continue to receive the encouragement and indorsement from those engaged in this branch of industry, which has characterized the work thus far, it is not improbable that it will be published in book form after being completed in THE CIRCULAR.

Yours respectfully, C. S. CROSSMAN.

New York, Oct. 13, 1886.

AN ASSOCIATION OF MANUFACTURING JEWELERS WANTED.

To the Editor of the Jewelers' Circular:

I see that the National Association of Jobbers in American Watches offer a reward of five hundred dollars for information that will convict any of their number of selling at less than regular rates, which, it seems to me, ought to satisfy any reasonable retailer that in buying from members of the association he runs no risk of getting his goods at less than regular rates.

Now, would it not be a good idea for those manufacturers and jobbers in watches and jewelry who represent goods to be just what they are to form an association, bind themselves to represent every article sold to be just exactly what it is and nothing more or less, and offer a reward of five hundred or five thousand dollars for information to convict any one of their number of selling an article for what it was not.

Would not thousands of honest retailers pour in their orders upon the members of such an organization who do not now know them? Now, the honest retailer wants to buy honest goods at honest prices; he knows there are such goods and he knows there are honest manufacturers and honest jobbers, but it is not every retailer who knows who they are. Some such arrangement would help the honest men among the manufacturers, jobbers and retailers and crush out the sharpers. What say you, Mr. Editor?

Halifax, N. C., Oct. 11, 1886.

FAIR PLAY.

KINDLY WORDS OF APPRECIATION.

To the Editor of the Jewelers' Circular:

It is my pleasant duty to convey to you the unanimous thanks of the members of the Executive Committee of the League, as expressed by them at their meeting held last evening, 1st inst., for the able and generous editorial in the September number of your journal, entitled, "The Jewelers' League."

Yours respectfully, WM. L. SEXTON, Sec.

DETERIORATION OF QUALITY AN INJURY TO THE TRADE.

I have read with much pleasure your criticisms from time to time on the injury that is being done to the trade by manufacturers continually debasing the quality of their goods to enable them to undersell their competitors. We retail dealers can no longer give a guarantee of the goods we sell, for we have no assurance that they are what they purport to be. It used to be sufficient for us to know that our goods were made by certain manufacturers to be certain that they were up to the standard, but now almost every one of them

seems to be making fourteen karat goods out of ten karat gold—indeed, we are fortunate if we find ten karats in them. Independent entirely of the question of honesty involved in such transactions, it is bad policy, for these "tricks of the trade" have become so well understood by the public that they no longer have confidence in anything we tell them. When I show a customer the stamp of the manufacturer on his goods indicating that there are fourteen karats of gold in them, I am told that the stamp does not amount to anything, for it is just as easy to put it on fraudulent goods as honest ones, and that its use is no longer a matter of conscience with them. While it is necessary for me to carry all qualities of goods, I have a class of customers that want genuine goods, and price is with them a secondary consideration. With fine goods, that I could warrant being fully up to the grade stamped upon them, I could get good prices and a nice profit, but the customers who want this class of goods have grown skeptical and put no faith in the manufacturers' stamp. They will not buy the cheap goods, and so it is with the utmost difficulty that I can satisfy them, even having to give my personal guarantee and promising to take the goods back if they are not satisfactory. Now, when I sell an article I like to consider it as sold in fact, and not liable to come back on my hands at any time; but recently, in two instances, that has been my experience. There is more profit in fine goods than in the cheap ones, and it takes no more time and labor to sell them provided the quality is right. Manufacturers have gone on cheapening their goods in order to meet competition till the public has lost confidence in the trade as a whole and requires individual guarantees.

But it is not alone in jewelry that this destructive policy has been pursued. Just see how the trade in cases has been demoralized by this course. The manufacturers have not only exhausted their ingenuity in striving to find out how thin they could draw out the gold in a watch case, but they have made up the weight by adding to the springs and base metal work, so that a customer is required to pay the price of gold for iron or steel. Some time ago I ordered from a maker of cases a large number of cases of specified weights, stipulating just how they should be made, and that the gold should be absolutely fourteen karats fine. I was told that I could never sell them, for the reason that my competitors had cases that looked just as well that they could sell at less price. I told them that they lost sight of the fact that there was a large class of the community to whom price was not so much of an object as honest goods, and that if they would furnish me goods that I could swear by I would take the chances of selling them. They sent me the goods as ordered and I had no difficulty in selling them. In a very short time I duplicated my order. I find in practice that when I tell a customer that one article I can guarantee as being all that is claimed for it while of another I can give no such guarantee, he almost invariably takes the best, and I make a better profit on the sale. The class that wants genuine gold goods is growing larger every day, and this fact the manufacturers apparently lose sight of. There are those who delight in cheap and tawdry jewelry, but these are not the kind of customers I care to cater to; let them go to the bazaars, the Cheap Johns, the barber shops and the laundries for goods of this kind. I would like to see the retail dealers handling only fine goods; let them be jewelers in fact as well as in name. Then if a customer asks for debased goods, refer him to the hardware store where they deal in cheap metal goods. I am surprised that manufacturers cannot see that their present practices are working their own destruction.

Pittsburgh, Oct. 15.

J. G. M.

WAYS OF COMMERCIAL TRAVELERS.

To the Editor of the Jewelers' Circular:

I suppose that commercial travelers have become a necessity of modern methods of doing business, but they add immensely to the cost of doing it, and, for my part, I had rather dispense with their visits. I have been in the retail business many years and have encountered the traveler in all his phases, and while there are some

gentlemen and thoroughly good business men among them, I am free to say that as a class they are objectionable. Especially is this true of those callow fledglings turned loose by some cheap houses, who, while scarcely freed from their mothers' apron strings, know more about the business of every person they afflict with their presence than he does himself. The impudence of these nuisances is something colossal, reaching to the height of positive insult sometimes if one dares to refuse them an order. I write feelingly on this subject at this time, for it was only yesterday that I had to kick one of these fellows out of my store because of his impudence, vulgarity and profanity. He commenced by abusing the manufacturers of certain goods that I had in stock, accusing them of about all the crimes in the calendar, and then fell to abusing me because I would not buy the goods he offered, made by some one I had never heard of before. He would not take no for an answer, nor would the fact that customers were waiting to see me induce him to leave, and finally when he got to using bad language in the presence of customers, I took him by the neck and escorted him to the door where I administered a gentle reminder that I do not care to see him again. I admit that this was an exceptional case, for while I have had occasion to feel annoyed at the persistency of a traveler before, I never received abusive language from any. Why is it that these men cannot be taught to represent their employers in a dignified and businesslike manner? There are altogether too many of these young and cheap men on the road to be of service to either the dealers or their employers. Many of them leave an unsavory record behind them at the hotels they patronize, and certainly prejudice the trade against the firms that send them out. I am always willing to talk to a gentleman when he calls upon me, but I insist that I know my own business better than they do, and if they would admit that fact I should have no objection to traveling men. Why cannot they be satisfied when I tell them that I do not want any goods? In spite of my protestations to that effect, I have had them spread their samples all over the store and take up my time for two hours or more, I submitting to the infliction rather than to seem impolite or crusty. It seems to me that all employers of travelers should impress it upon their representatives that the surest way to make friends is to always be gentlemanly, and never to interfere with the business of those they are soliciting. Of course, there are many travelers who do their business in a manner to which no exception can be taken; they are gentlemanly, courteous and considerate, with whom it is a pleasure to do business. Gentlemen of this class will not take exception to my statement that there are many travelers on the road who are utterly unfit to represent anything better than a gin mill or a disorderly house, whose language savors of these places, and who have not the faintest idea of what constitutes a gentleman. I write emphatically with the hope that the employers of these cheap men may see that it is far from an advantageous thing for them to keep that kind of cattle on the road. There is room for a great deal of reform in this matter, and respectable and responsible houses should be exceedingly careful as to the kind of men they send out to represent them among dealers who have little leisure to waste in unprofitable boredom.

Kansas City, Oct 14.

G. R. T.

THE STANDARD FOR WROUGHT GOLD.

To the Editor of the *Jewelers' Circular*:

I am pleased to see that you have revived the subject of a United States standard for wrought gold. I have always favored this idea and hope to live long enough to see it adopted. There are many jewelers who are opposed to it, because they wish to be free to debase their products to any extent that may be required by the competition they encounter from time to time. They fail to realize the fact that if we had a uniform standard for gold they would not be brought into competition with base metal goods, and so would be under no obligation, either actual or implied, to degrade their goods. Let the line of demarkation be once clearly and legally defined between gold goods and imitation goods, and the seller of the latter

made liable to imprisonment unless he distinctly labels his goods "imitation," and the honest manufacturers of genuine gold goods will have some protection. As the matter now stands, no sooner do they bring out something new, an article that may have cost them a large sum to design and perfect, than it is pirated by the cheap goods men and made up in debased metal. Half the time the base goods are sold as genuine, and retail dealers often admit that they can get just as good prices for ten karat goods as they can for fourteen. If these dealers were compelled, by a national law, to label their imitation goods there would be no opportunity for frauds of this character. Congress should be called upon to pass a law fixing the standard of pure gold at twenty-four karats, and declaring that anything below twelve karats shall be deemed and sold as base metal only. Then let manufacturers make gold goods of any degree of fineness between twelve and twenty-four karats, but require them to specify precisely what that degree is. As but little jewelry is more than fourteen karats fine, there would not be a very wide range for fraud even if the goods were not stamped. The main point would be gained when goods debased below twelve karats were treated as the base metal of which their bulk is composed. The trade, quite as much as the public, requires protection from the frauds now perpetrated by manufacturers of bogus goods. I use the term bogus advisedly, in contradistinction to cheap goods, that are honestly made and for which there is a legitimate demand. I would not interfere with the manufacture or sale of cheap goods, but I would have them sold for what they are; but I would like to see the most stringent laws enforced to prevent the sale of bogus goods for genuine gold. The jewelers themselves are the ones who should ask for the passage of such a law, not only for their own protection, but to convince the public that they mean to deal honestly by them. I hope this subject will receive more general attention than has been bestowed upon it heretofore, to the end that we may eventually obtain a national law to regulate the standard of wrought gold.

Chicago, Oct. 19.

L. M. B.

Bushing Pivot Holes, Etc.



EVERY WATCHMAKER, says Cl. Saunier, knows how to proceed in adjusting an ordinary perforated bouchon or stopping. We would make a few remarks on the subject of bouchons generally.

The tapped bouchon is very firm, but, in order that it may be well centered, it is essential that its thread fits exactly the tube of the tool. When bushing holes that are rather large with solid bouchons, after the hole has been marked with the pointer, it must be drilled with a small drill, a larger one being subsequently passed through, so as to increase it; otherwise, there is great danger of the hole turning to one side.

If a hole, such as that of the center wheel, is bushed with a perforated bouchon, it will often be found to incline toward the barrel or fuze, so that the hole is displaced. Such an inconvenience may be avoided by using a bouchon with a hole smaller than is ultimately required, afterward enlarging it with the plate centered (by the bar pivot hole) in the mandril or lathe.

Riveting of Bouchons.—Some watchmakers have found considerable advantage in replacing the sudden and irregular impacts of a hammer by gradual pressure, without shock, obtained by a small press worked by hand on the principle of a punching machine. With a well-made bouchon, the flat end of which is slightly rounded, and the inside of the hole in the plate finished with a rat-tail rather than with a cross file, it is found that the riveting is always perfect. Others employ an ordinary pair of sliding tongs, the noses of which are drilled to receive two punches one flat and the other rounded, as in the mainspring punch. Three pairs of punches suffice for all sizes of bouchon, and the same tool can be used for closing up screw holes, etc.

Artificial Rubies.



THE SUBJECT of artificial gems is at the present moment of considerable interest, not only financially, but also as furnishing an example of the manner in which the microscope is constantly called into use by almost every profession. Early this Summer the Syndicate des Diamants et Pierres Precieuses were informed that certain stones which had been sold as rubies from a new locality were suspected to be of artificial origin. They were put upon the market by a Geneva house; and it was surmised that they were obtained by the fusion of large numbers of small rubies, worth at the most a few dollars a karat, into one fine gem worth from \$1,000 to \$2,500 a karat.

Some of these artificial stones were kindly procured for me by Messrs. Tiffany & Co. I was not, however, permitted to break them for analysis, to observe the cleavage, or to have them cut so that I could observe the optical axes more correctly. I would at any time have detected the artificial nature of this production with a mere pocket-lens, as the whole structure is that peculiar to fused masses. Examination elicited the following facts: The principal distinguishing characteristic between these and the genuine stones is the presence in them of large numbers of spherical bubbles, rarely pear-shaped, sometimes containing stringy portions showing how the



FIG. 1.—Spherical cavities in artificial ruby as seen at one time (enlarged 75 diameters).



FIG. 2.—Spherical and irregular cavities in artificial ruby as seen at one time, evidently from the lower part of the crucible (enlarged 25 diameters).

bubbles had moved. These bubbles all have rounded ends, and present the same appearance as those seen in glass or other fused mixtures. They are nearly always in wavy groups or cloudy masses. When examined individually they always seem to be filled with gas or air, and often form part of a cloud, the rest having the waviness of a fused mixture. Some few were observed enclosing inner bubbles, apparently a double cavity, but empty. In natural rubies the cavities are always angular or crystalline in outline, and are usually filled with some liquid, or, if they form part of a "feather," as it is called by the jewelers, they are often arranged with the lines of growth. Hence the difference in appearance



Liquid cavities in natural ruby and sapphire (enlarged 100 diameters).

between the cavities in the natural gem and those in the fused gem is very great, and can readily be detected by the pocket-lens. I have failed to find in any of the artificial stones even a trace of anything like a crystalline or angular cavity. Another distinguishing characteristic is that in many genuine rubies we find a silky structure (called "silk" by the jewelers), which, if examined under the microscope, or under a $\frac{4}{10}$ to $\frac{8}{10}$ inch objective, we find to be a series of cuneiform or acicular crystals, often iridescent, and arranged parallel with the hexagonal layers of the crystal. When in sufficient number, these acicular and arrow-shaped crystals produce the asteria or star effect, if the gem is cut in *en cabochon* form with the center of the hexagonal prism on the top of the cabochon. I have failed to find any of them in the stones under consideration, or even any of the marking of the hexagonal crystal which can often be seen when a gem is held in a good light, and the light allowed to strike obliquely across the hexagonal prism. Dr. Isaac Lea has suggested* that these acicular crystals are rutile, and interesting facts

and illustrations have been published by him. From my own observations on many specimens I believe there is little doubt of the truth of this hypothesis.† My explanation is, that they were deposited from a solution, either heated or cold, while the corundum was crystallizing, and I doubt very much whether they will ever be found in any substance formed by fusion.

The hardness of these stones I found to be about the same as that of the true ruby, 8.8, or a trifle less than 9, the only difference being that the artificial stones were a trifle more brittle. The testing-point used was a Siamese green sapphire, and the scratch made by it was a little broader but no deeper than on a true ruby, as is usually the case with a brittle material. After several trials I faintly scratched it with chrysoberyl, which will also slightly mark the true ruby.

The specific gravity of these stones I found to be 3.93 and 3.95. The true ruby ranging from 3.98 to 4.01, it will be seen that the difference is very slight, and due doubtless to the presence of the included bubbles in the artificial stones, which would slightly decrease the density. As a test, this is too delicate for jewelers' use; for if a true ruby were not entirely clean, or a few of the bubbles that sometimes settle on gems in taking specific gravities were allowed to remain undisturbed, it would have about the same specific gravity as one of these artificial stones.

I found, on examination by the dichroscope, that the ordinary image was cardinal red, and the extraordinary image a salmon red,



FIG. 3.—Acicular crystals in sapphire (enlarged 100 diameters).



FIG. 4.—Cuneiform crystals in ruby and sapphire (enlarged 200 diameters).

as in the true ruby of the same color. Under the polariscope, what I believe to be annular rings were observed. With the spectroscope, the red ruby line, somewhat similar to that in the true gem, is distinguishable, although perhaps a little nearer the dark end of the spectrum.

The color of all the stones examined was good, but not one was so brilliant as a very fine ruby. The cabochons were all duller than fine, true stones, though better than poor ones. They did not differ much in color, however, and were evidently made by one exact process or at one time. Their dull appearance is evidently due in part to the bubbles. The optical properties of these stones are such that they are evidently individual or parts of individual crystals, and not agglomerations of crystals or groups fused by heating.

In my opinion, these artificial rubies were produced by a process similar to that described by Fremy and Feil (*Comptes Rendus*, 1877, p. 1029),—by fusing an aluminate of lead in connection with silica in a siliceous crucible, the silica uniting with the lead to form a lead glass, and liberating the alumina, which crystallizes out in the form of corundum in hexagonal plates, with a specific gravity of 4.0 to 4.1, and the hardness and color of the natural ruby, the latter being produced by the addition of some chromium salt. By this method rubies were formed that, like the true gem, were decolorized temporarily by heating.

It is not probable that these stones were formed by Gaudin's method (*Comptes Rendus*, xix. p. 1342)—by exposing amorphous alumina to the flame of the oxyhydrogen blowpipe, and thus fusing it to a limpid fluid, which, when cooled, had the hardness of corundum, but only the specific gravity 3.45, much below that of these stones. Nor is it at all likely that they were produced by fusing a large number of natural rubies or corundum of small size, because by this process the specific gravity is lowered to that of Gaudin's product. The same also holds good of quartz, beryl, etc.

The French syndicate referred the matter to M. Friedel, of the Ecole des Mines, Paris, supplying him with samples of the stones for

* Proc. Philad. Acad. Sc., Feb. 16, 1869, and May, 1876.

† Paper on star garnets, N. Y. acad. sc., May, 1886.

examination. He reported the presence of the round and pear-shaped bubbles, and determined the hardness and specific gravity to be about the same as of the true ruby. On analysis, he found them to consist of alumina, with a trace of chromium for the coloring matter. The cleavage was not in all cases distinct; and the rough pieces given to him as examples of the gem in its native state had all been worked, so that nothing could be learned of their crystalline structure. When properly cut according to axes, they showed the annular rings. The extinction by parallel light was not always perfect, which he believed to be due to the presence of the bubbles. He states that he himself has obtained small red globules with these inclusions by fusing alumina by oxyhydrogen light; and, although having no positive evidence, he believes these stones to be artificially obtained by fusion.

On the receipt of M. Friedel's report, the syndicate decided that all cabochon or cut stones of this kind shall be sold as *artificial*, and not precious gems. Unless consignments are so marked the sales will be considered fraudulent, and the misdemeanor punishable under the penal code. All sales effected thus far, amounting to some 600,000 or 800,000 francs, shall be cancelled, and the money and stones returned to their respective owners.

The action taken by the syndicate has fully settled the position which this production will take among gem dealers, and there is little reason to fear that the true ruby will ever lose the place it has occupied for so many centuries. These stones show the triumphs of modern science in chemistry, it is true; and although some may be willing to have the easily attainable, there are others who will almost want, what the true ruby is becoming to-day, the unattainable. One will be nature's gem, and the other the gem made by man.

The following recapitulation of the progress made from time to time by the different investigators in the artificial reproduction of ruby and sapphire may be of more than passing interest at this moment: Gaudin (C. R., 1857, Vol. IV, p. 999, and 1857, Vol. XLIV, p. 716.—L'Inst., t. XXV, p. 110.—J. pr. Chem., LXX, p. 381.—Bibl. univ. de Genève, t. XXXIV, p. 68.—Jahrb. f. Min., 1857, p. 444) was the first to reproduce corundum, which he did by heating before the oxyhydrogen blowpipe a closed crucible containing equal parts of alum and sulphate of potash and charcoal. It was fired for fifteen minutes and then slowly cooled. The mass was then lixiviated and attacked with diluted aqua regia, which left a sand formed of small corundum crystals, 1 mm. long and $\frac{1}{3}$ mm. thick. They were hexagonal plates having bases striated in three directions parallel to the sides. Some very fine included microlites resembling sillimanite were also observed in these crystals.

Elsner (J. pr. Chem., t. XVII, p. 175), operating in the same way, by fusing before the oxyhydrogen blowpipe anhydrous alumina with bichromate of potash obtained red crystalline grains as hard as rubies.

De Sènmont (C. R., 1851, t. XXXII, p. 762.—L'Inst., 1851, p. 165.—Ann. Chem. Pharm., t. LXXX, p. 214.—Pharm. Centr., 1851, p. 518) has applied the wet way to the crystallization of alumina. He heated in a sealed tube, at 350° C., a solution of chloride of aluminum, or of nitrate of alumina, and produced rhombohedrons with truncated edges.

Almost at the same time Ebelmann obtained corundum (Ann. de Phys. et de Chim., 1851, t. XXXIII, p. 34) by a totally different process. He heated in a porcelain kiln a platinum crucible containing one part of amorphous alumina with three or four parts of borax. After a few days of heating all the borax was volatilized, and at the bottom of the crucible crystals of corundum were found, and on the edges long bluish needles of borate of alumina, which he separated by the action of chlorhydric acid. The corundum thus obtained was in hexagonal plates like specular iron of volcanic origin, and was quite similar to that obtained by Gaudin.

† See Encyclopédiè Chimique, Tome II, Reproduction Artificielle des Mineraul. Par M. L. Bourgeois.

The base is striated by three systems of lines parallel to the sides. Numbers of very irregular vitreous inclusions were noticed in them, as well as microliths resembling sillimanite. The density of the crystals was 3.98, and, like the natural stone, they scratched topaz; they have, as in natural specimens, $a' p. = 122^{\circ} 35'$

Carbonate of baryta added to the mixture facilitates the formation of the crystals and the development of rhombohedral faces, which thus attain a length of several mm. Carbonate of lime may be added or the borax wholly replaced by carbonate of soda, but hexagonal or dodecahedral plates will still be obtained. Ebelmann colored his product by small quantities of metallic oxides. For example, violet was obtained by oxide of manganese (Oriental amethysts). It was noted that boracic acid alone could not replace the borax. Sainte-Claire Deville and Caron (C. R., 1858, t. XLVI, p. 764.—L'Inst., 1858, p. 133.—Ann. Chem. Pharm., t. CVIII, p. 55.—Dingl pol. J., t. CXLVIII, p. 372.—J. pr. Chem., t. LXXIV, p. 157) obtained magnificent specimens of corundum by a different method. They placed anhydrous fluoride of aluminum $Al_2 F_6$ at the bottom of a charcoal crucible, and suspended in the center of this a cupel of the same substance filled with boracic acid. The whole apparatus was allowed to remain at white heat for an hour, and on opening the crucible they found the interior lined with large thin hexagonal plates of corundum, presenting the combination $a^1 p e^2$. There were no striae on the bases, but only hexagonal rosettes projecting, and brown aborescences. Vitreous inclusions of boracic acid with bubbles of gas were observed, often arranged in crowns, and fine microliths were also noticed, as already mentioned. They found that by adding a little fluoride of chromium to that of aluminum, and using a clay crucible with cupels of platinum, they could produce rubies together with a little sapphire. When they increased the quantity of fluoride of chromium they obtained green crystals (Oriental emeralds).

Debray (C. R., 1861, t. LII, p. 985.—L'Inst., 1861, p. 165.—Ann. Chem. Pharm., t. CXX, p. 184.—Jahrb. f. Min., 1861, p. 702.—Bull. Soc. Chim., 1865) describes several methods of obtaining corundum. He passed a slow current of chlorhydric acid over aluminate of soda at a red heat or over a mixture of phosphate of alumina and lime. In the latter case calcic wagnerite was also produced. M. Debray has also produced crystals of alumina by melting phosphate of alumina with three or four times its weight of sulphate of potash or soda, and thus producing an alkaline phosphate.

Quite recently H. Grandeau (C. R., 1882, t. XCV, p. 921) has had occasion to apply the preceding method to various oxides, and has found that particularly with alumina, after several hours of heating, a crystallized double phosphate of alumina and potash is obtained at the same time as the corundum.

The mineral-producing qualities of fluohydric acid have been well employed by M. Hautefeuille in reference to alumina. It was only necessary to make the vapor of this acid (Ann. Chim. Phys., 1865, t. IV, p. 153.—Jahresb., 1814, p. 206) pass slowly over the amorphous alumina heated to a bright red heat in a platinum tube, previously diluting it with nitrogen and steam. On the hottest part of the tube foliated hexagonal plates of corundum will form, resembling very much specular iron of volcanic origin. The more the operation is prolonged the more beautiful these become, for the smaller crystals are destroyed to make way for larger ones.

M. Gaudin (C. R., 1869 t. LXIX, p. 1342), in 1869, gave a second method of producing corundum by exposing amorphous alumina to the flames of the oxyhydrogen blowpipe. This oxide melts into a very clear, fluid glass, which in cooling hardens into a crystalline globule as hard as corundum.

MM. Fremy and Feil (C. R., 1877, t. LXXXV, p. 1029) have produced specimens of corundum remarkable for the size of the individual crystals and the weight of the crystalline masses, by means of a double decomposition in the dry way. They melted at a bright red heat in a large crucible of very silicious material equal weights of alumina and minium, producing thereby a fusible aluminate of

lead, which is soon destroyed by the silica of the crucible, and gives place to a still more fusible silicate and liberating the alumina, which crystallizes in the body of the liquid. Part of the lead is also volatilized or reduced by the gas of the furnace. Breaking the crucible, they found a superficial, vitreous layer of silicate of lead, and underneath a mass of corundum crystals grouped in magnificent geodes. By the addition of a little bichromate of potash rubies were obtained, and sapphires by the further addition of a little oxide of cobalt. These are the most beautiful crystals of ruby and sapphire that have ever been obtained, but their hexagonal tabular form unfits them for cutting. They have the properties of corundum; $D=4.0$ to 4.1 . The rubies, like natural stones, were temporarily decolorized by heating. MM. Fremy and Feil have also added fluoride of baryum to the aluminate of lead in the preceding experiment. The two reagents were mixed in equal parts with the addition of a little bichromate of potash, and heated in a silicious crucible surmounted by another reversed crucible. In the lower crucible they obtained a geode of ruby with vitreous inclusions, while the upper one was lined with long needles of a silicate of alumina and baryta. According to the analysis of M. Ferreil this product is probably a barium anorthite.

MM. Fremy and Feil endeavored to retard the reactions in this experiment so as to increase the size of the crystals. M. Stanislas Meunier (C. R., 1880, t. XC, p. 701), decomposed in a red hot tube chloride of aluminum by the use of steam. In several experiments magnesium or zinc were also used as reagents. Corundum was thus produced in hexagonal plates or crystalline grains. MM. Fouquè and Michel Levy accidentally observed the formation of corundum in beautiful hexagonal plates while they were fusing microcline feldspar with flourite. The corundum by sublimation lined the platinum cover of the crucible in which the experiment was made.

Last of all M. F. Parmentier (C. R., 1882, t. XCIV, p. 1713), in a work relative to the action of molybdates upon oxides by the dry process, has announced that the fusion of amorphous alumina with bimolybdate of potash will furnish corundum in plates like tridymite. It is important to keep the temperature of the crucible high, for if it is lowered an inverse reaction takes place.

I presented this paper at the meeting of the New York Academy of Sciences, October 4, 1886.

GEO. F. KUNZ.

Springing Watches.



IT IS VERY essential that a springer and timer be thoroughly acquainted with the art of escapement making, says Mr. J. U. Poole, but there are many other points in a watch which call for an equal knowledge of finishing, and in most manufactories, where any number of watches are turned out, an inexperienced finisher fits the movements in the cases and is responsible for the mainspring being free in the barrel and the correctness of the stop-work, freedoms, depths, etc., leaving the escapement to the more delicate manipulation of the springer, who ought to make a preliminary examination before the watch is put together. It is but rarely that an escapement is found to be quite correct at the last, and a common cause of alteration arises from the inferior steady pins put in by many movement makers, which few escapement makers take the trouble to alter, although it is an axiom in good work to start with a proper foundation, and if the balance staff and escape wheel are thoroughly upright, before the pallet-staff holes are put in, any subsequent derangement is easily rectified.

The first thing a springer should acquaint himself with is the strength of the mainspring; in a fuzee watch this is obliged to be regulated by the strength of the chain, a point which is often overlooked. The quality of chains has unfortunately degenerated of

late years, and the disrepute into which fuzee watches have fallen in certain quarters has arisen, in a great measure, from this fact. If the balance is considered by the springer to be too light, he should apply a strong balance spring, and bring it to time by adding additional screws, frequently platina, or, if too heavy, the screws should be reduced, and one or two pins removed.

The next point which is essential to the proper adjustment of a watch is that the pendulum collet should fit properly and be well made. The spring collet arbor of the balance staff must be slightly the largest in the center so as to allow the collet to press nicely down. If it fits too tightly there is great danger of bending the balance arm or of setting the rim out of truth in taking it off, which may have to be done several times during the process of adjustment. A collet should never be squeezed up to make it fit; it is a mischievous proceeding, causing annoyance to every one who attempts to handle it. After the collet is made the balance is "cut," an operation usually performed by the balance makers, who make a distinct branch of it, although in the olden time it was done by the springer. I once saw the late Mr. Earnshaw cut a balance, and perhaps a sketch of his manner of doing may be interesting.

He first removed the screws from the balance and placed them before him, in a straight line, in holes on his bench; then with a narrow file cut through the rim close to the opposite sides of the arm. This caused the rim to slightly fly open, and its circular form was restored by placing it over hollows of varying depth, filed in a piece of boxwood, and lightly rubbing it with a piece of metal inside. After testing the truth in the calipers, Mr. Earnshaw put the balance in an escapement box and held it over the gas, in order to "set" it; the tendency of a compensation balance is to slightly "set inward," after being tried in the oven, causing an alteration of rate, and long experience enabled him to so leave the rim that the heat he subjected it to should bring it true. The screws were then replaced with a regard to the thickness of the rim and its consistency. If it was stout and stubborn, the screws were put forward toward the cutting, but if, on the contrary, it was light and springy, they were kept toward the back. At the same time the balance was carefully poised, either by shifting the screws from side to side, or by reducing those which required it. It was then handed over to the springer, and by far the larger number of watches sold with compensation balances received no further adjustment. The springer brought the watch to time by taking up or letting out the spring, and contented himself by getting the hanging and lying positions pretty equal. The model adjuster I have in my mind's eye, however, would proceed in a very different manner. First, the spring would be pinned in, in "equal turns," that is, the point where it is pinned to the collet and stud should be at right angles to the cock; if the angle is less than a right angle, the watch will certainly go slow in positions, or *vice versa*, the last being the best fault. Assuming that the watch is going a little too fast, it is brought to time by adding a pair of screws of the requisite weight, and then tried in the oven. Here let me remark that the principle of the action of the compensation balance is directly opposite to the popular notion of the expansion and contraction of metals, which are known to expand in heat and contract in cold, whereas a balance becomes smaller in the one and larger in the other. This is owing to the varying powers of expansion and contraction of the two metals of which the rim is composed, it being one-third steel and two-thirds brass, the ratio of expansion of the latter being greater than the former, or in the proportion of 3:2.

The balance spring is effected by all changes of temperature, becoming weaker in heat and stronger in cold, so that the balance "compensates" for the changes which take place in it.

The compensation is a task requiring great care and patience; not unfrequently small screws have to be substituted near the cutting, and the weight made up by placing another small pair behind; on the other hand, I have known instances where balances have gone so slow in the heat that platina screws have had to be substituted for

gold and the watch resprung in consequence. The compensation being at length considered correct, the spring is taken off and the balance very carefully poised. It is necessary to remark that no screws but the quarter screws should be touched after this operation, or it will require doing over again; of course it is most essential that the balance is perfectly well made and all the screws interchangeable. The spring is set true and flat, and the watch brought to time again by the quarter screws; the regulator should be left toward "fast" during the compensation, in order to allow for what may be taken off in poising.

During the time that a watch is being timed in positions, it should be carefully listened to at frequent intervals, and the arc of vibration of the balance observed, for many irregularities arise from defects of construction, and cannot be overcome by the timing screws; in fact I consider that one of the chief advantages of putting a watch through the process of adjusting is the extra careful examination which it receives in consequence. A watch to be thoroughly manageable for adjusting should cross about one turn and a third lying and one turn hanging; the theory is, that the balance should be perfect in poise, and all corrections made by the spring and escapement, but the fact is, that only a very small percentage of watches will perform the same "all around," and the variations in certain positions must be counteracted by the screws.

I will, for example's sake, presume that a watch is gaining 24 seconds in 24 hours lying, and going to time hanging, the balance being perfectly in poise; it should be tried for a few hours with the quarters downward, and equalized in these positions by turning out a screw on the side it is losing, and then tried again hanging and lying, when it will most likely lose about 9 seconds in 24 hours hanging and gain 15 lying. I should then turn out the lower screw one turn, and turn in the upper one-half a turn, reducing the hanging. It must be understood that I am speaking of a fuzee watch, with equal adjustments; the conditions of working on one with going barrel are altogether different.

Clock Making in the Black Forest.



THE FOLLOWING report of Frank W. Ballou, United States Consul at Kehl, Germany, has just been published by the State Department:

There is scarcely a city in Germany or in Europe, perhaps outside the limits of this continent, where one cannot find clocks from the Black Forest. It is rarely the case that a branch of industry becomes so extended as the above mentioned, and the Black Forest clocks have become typical for the description of the idea conveying the comfort and snugness of a South German home.

Owing to the barrenness of the soil and the custom in the Black Forest region that farms belonging to a father's estate can only revert to the eldest son, the other children of the family, who were and are still, as a general thing, numerous, were obliged either to emigrate or to engage in mechanical labor of some kind, which was made easy and profitable owing to the magnificent forests furnishing the necessary wood.

As is shown by reliable data the manufacturing of wooden ware, such as turners' and coopers' articles, was carried on largely in the time of the Emperor Rodolphus of Hapsburg. Afterwards the making of tin spoons, brushes and other wares began. Towards the end of the seventeenth century farmers who could not maintain their families from the products of their farms began to engage in clock making. Poor cottagers without property, but with inventive genius, and dependent upon the labor of their hands, became the patriarchs of clock making. Their sons and their apprentices introduced this industry in the districts where it is to-day a flourishing business. The case and movement of these clocks were made

with tools of the very plainest description, such as a pair of compasses, a little scroll saw, augers, and a knife. These wooden clocks proved to be a fortunate invention; they found a good sale and awakened the artistic talent of their inventors. The art of clock making was still the monopoly of the patriarchs, their sons, and grandsons, but the inventive genius that is inherent to the inhabitants of the Black Forest united the different experiences gathered in various workshops and made use of them, so that the local extent of this clock industry became largely increased.

In the middle of the last century clock making in the Black Forest was already carried on in all the localities where it now exists. The construction of such a wooden clock with heavy weights was very plain. It consisted of three wheels only, a vertical swing wheel put into motion, a balance resembling a yoke, to which were attached several leaden weights in order to regulate the movement of the clock. This construction was, however, abandoned in 1740. It was supplanted by the pendulum clock. At first the pendulum was placed before the dial, afterwards a long pendulum was arranged behind the movement. All these clocks had to be wound up every twenty-four hours. Some of them were made to strike every quarter of an hour; clocks with automatic figures, such as peasants, soldiers that sounded a signal at the end of every hour, etc.; also clocks that recorded the month and days as well as the hours.

About the year 1750 they adopted movements made of wire instead of wood; afterwards metallic wheels were introduced. Since the year 1750 they manufactured very neat little carved clocks with weights, which were called "Jockele-Uhren," from their inventor, Jacob Herbstreit. At the beginning of this century clock making had become quite extensive and brought large profits to manufacturers. From 1830 to 1850, however, this industry did not prosper, owing to the stubborn preservation of old shapes and the manufacturing of clocks of inferior quality. With a view of stopping this decline a technical school for clockmakers was founded at Furtwangen, the center of the clock industry, in 1850, under the direction of Mr. Gerwig, who afterwards became one of the builders of the St. Gothard Railroad. Its purpose was to educate persons in the making of clocks, and to have this industry keep up with the times and progress manifested in other countries, and also to introduce the manufacture of watches.

The latter project had to be abandoned owing to foreign competition, but in other respects the influence of the school was soon felt, for since that time they make better and finer clocks, which answer more the requirements of artistic taste. After a twelve years' existence, when the task of the school was considered to be accomplished, it was dissolved; however, professional schools were founded in the principal localities of the Black Forest, in order to give the necessary technical knowledge to apprentices.

Prominent manufacturers also organize exhibitions showing the condition of clock-making, and the progress made therein. Although modern, fine clocks are principally made, there are still establishments which produce the traditional old-fashioned clocks, such as they made 150 years ago, with the primitive wheels and the plain wooden dial. This is less due to the adherence of the Black Forest inhabitants to old tradition than to the fact that these clocks are still largely sought for on account of their durability. At one time the maker made everything that belonged to a wooden clock. But soon the increase of sales rendered a division of work necessary. No sooner did the clockmakers see that their products went off rapidly than they left to others the preparation of those parts which required more care than art. This was the first step towards that astonishing development of this industry, because it gave time and leisure to the artist to entirely apply his talent to new inventions and improvements.

Owing to the increasing demand it became necessary to divide the various branches of the clock industry, but the latter retained nevertheless the character of a house industry, because the workmen are not employed in factories; they are small farmers, having

an acre or two of land with some cattle, and their spare time is devoted to making parts of clocks. This system will undoubtedly remain, owing to the peculiarities of the Black Forest and the character of its inhabitants. The division of labor for a Black Forest clock is as follows :

(1) The wood cutter, preparing the wood of beech tress for the case ; (2) the case maker ; (3) the maker of the plate (shield) ; (4) the painter ; (5) the founder of the bell and wheels ; (6) the chain maker ; (7) the spring maker ; (8) the carver ; (9) the dial maker ; (10) the decorator of the case, and (11) the maker of the primitive movement.

In the Black Forest there are 92 communities engaged in this industry, with 1,429 independent clockmakers, giving employment to 7,526 operatives. In 1796 these workshops turned out 75,000 clocks ; in 1808, 200,000, and in 1880 the total production was 1,800,000 clocks. In the city of Furtwangen were manufactured over 400,000 of these.

The first clockmakers only made a few clocks for the surrounding farms. The favor these clocks met with determined some dealers in glassware and straw hats to take them among their articles. The net profit they realized was so considerable that it excited the envy of the clockmakers, who upon that experience sent the clocks on their own account to the neighboring large cities in Brisgovia and Suabia. They gradually extended their trade, and divided the markets in the different provinces of Germany among each other ; some of them even traveled to Asia and Africa. The Black Forest clocks are sent to all points of our globe.

Germany takes all kinds of clocks, from the finest regulators to the plainest wooden clock.

Austria buys only cheap articles, such as chain-work clocks. The high entrance duties are an impediment to the trade.

Switzerland has a predilection for trumpeter and cuckoo clocks for the use of strangers, and drag-spring clocks for the native population.

England takes trumpeter and cuckoo clocks and regulators. Some years ago there was a good demand for cheap clocks with weights, but this has materially decreased, owing to the sharp competition from American manufacturers.

France bought no clocks for several years immediately after the war. At present they buy many carved clocks, called "Schottuhren."

Belgium and Holland require wooden clocks with bronze frames.

Russia imports a large number of carved regulators, also light day clocks in polished cases, to be used on Russian farms.

Turkey desires mostly cuckoo clocks, with paintings.

Spain and Portugal buy bronze-framed, carved clocks, with weights.

The United States takes trumpeter and cuckoo clocks with painted dials ; also many regulators and musical clocks.

The exportation of the clocks to the United States is steady, and will aggregate \$50,000 per year. During the summer months the Schwarzwald clock region is visited by many Americans, and nearly every visitor purchases one of these clocks. They are very attractive and appear to be cheap, but in many cases they are made to be sold only, and an attractive exterior may induce many to purchase an almost worthless article.

One cannot be too particular when purchasing one of these clocks, for when the cuckoo will not coo any more, and the trumpeter will not blow another blast, then is their value as curiosities gone, and when, after a few months, they become valueless as timekeepers, then are they very poor stock indeed. I have heard so many complaints from people who have purchased these clocks in regard to their general poor quality, that I deem it my duty to make this fact public, and also to inform would-be purchasers that, if they wish to

avoid disappointment, they should be very particular where and of whom they purchase, and in no case to purchase of irresponsible parties. A few inquiries will generally disclose the required facts.

The Art of Turning.



THE ART of turning with the bow and common turns is so valuable to the watch repairer, says M. Ganney, that no opportunity should be lost by young watchmakers to acquire facility in this branch of the business, as advancing years render it almost impossible to atone for any neglect of this subject in early youth. A certain amount of daily practice is the only sure means of acquiring it, and it was at one time the usual plan of teaching a youth his business to let him have at least two hours a day at turning, as the ordinary watch repairing business, unlike escape making and finishing new work, does not give the opening for turning talent to be developed ; and the supply of material now being so prevalent, instead of making new pieces as required, it behooves all having apprentices to make provision in this respect by making the learner produce himself all screws, arbors, plugs and stoppings, and rough out, for the other workmen, the pieces that they finish and put into the watches. The spectacle, now too common, of young men who have served a number of years and quite unable to replace a broken piece of watch work, would become rare. The usual routine of large and small clock work to commence with and finishing with coarse and fine watches, is admirably adapted to develop the mechanical ideas of the learner ; but the turning must be supplemented with more than what is required ordinarily in the course of the business of watch repairing.

Almost any sort of turns will do good pivoting, the only requirement being rigidity of centers when fixed, and firmness in the rest, which must be brought as close to the work as possible, and the center that holds the pivot that is turning must be as close as possible to the hole in the turns. For this reason many pivoters prefer the plainest possible turns with a piece of brass for a rest, having another piece of brass riveted on it, which is simply put against the turns, and the two screwed up in the vise, the work being brought close to the rest by the centers. This primitive and despised plan is better than using the Swiss turns, which being made to elongate so as to take in all sizes of common to the various jobs in use, is deficient in the prime element of rigidity, and the rest that usually accompanies them is three times the width it ought to be, and should be filed away to allow the shortest possible amount of center to be used. When a long center projects the work invariably becomes loose, as the pressure on such a long lever is more than the binding screw can counteract. What are known as English pivoting turns, when the rest is shortened, answers all the requirements of fine turning, as the centers are held firm by the split hole in which they fit, being closed throughout its length on the center by a screw working from the back, and not liable to accidental disturbances by a touch in working, and all parts very strong and rigid. The centers usually supplied with turns are not of much use, as all the holes are made in the center of the steel, and this prevents the work coming close to the rest and renders good or fine turning impossible, besides breaking both fine graver points and pivots by the vibration of the graver. Ordinary round steel must be fitted rather loosely, or, as dirt accumulates in the holes, there will be an amount of force required in moving the centers difficult to apply and dangerous to the work in hand, as the center must be moved lightly in all directions with one hand whilst the work is held lightly in position for fixing with the other. The back center must be a pointed one with only one hole or chamfer in it, made with a fine punch as near to the outer edge of the steel, when full size, as convenient. The surrounding steel must be all

filed away with a half-round potence file, forming an irregular hollow cone for a quarter of an inch; this may be considered the finest or finishing back center, and should have a hole in which the finest pivot point can rotate without side motion. The other end of the center should be made a center of the same kind, but much stouter and larger, to hold an arbor, when the pinion is first commenced on for turning. The fine point to the center is to allow it to pass freely up any ferrule in which the work is held, and all strength compatible with freedom should be obtained, and the hole at the center being at the side or eccentric allows the work to be raised or lowered or brought close to the rest as may be desired, and also in a straight line with the holes in the other center at which it is being turned. The right hand center is simply left full size and both ends filed quite flat, and small dots made round its extreme edge with a sharp punch completes the apparatus for turning. The ends of all centers should be made red hot and plunged in water; if hardened all over they may break when dropped or pulled roughly. One or two holes or dots may be made so close to the edge as to burst, or a slight nick cut, in which the point of a pivot rests, when being polished. As the various holes wear through they may be used for polishing pivots on, and holes that wear too deep and become dangerous thereby to the work by the friction they generate, must be restored to use by grinding the center on the oilstone. Many neglect to harden centers, but the advantages of hardening are very great—the friction is much less, and the constant wear and change of soft centers prevents the certainty and accumulation of experiences in the use of a tool which ensures perfection in such a delicate operation as fine turning. Another center, called a centering one, is quickly made by filing the plain steel center as a right angle on each side with its face and cutting a recess on each side; an arbor or pinion point resting on it, exposing its extreme end, may be truly centered by a very smooth old file; a new one will have too much power over it and push it off the center. Great lightness and rapidity are necessary in centering truly.

the weaker glasses and a longer one between the stronger glasses is well shown by the following example:

Take glass No. 80, suppose it is not strong enough and I try to increase its power by moving it an inch further away from my eye, it then becomes a glass of one inch less focal distance, a No. 79, the difference between $\frac{1}{79} - \frac{1}{80} = \frac{1}{6320}$, the increase of power which can be obtained by moving such weak lenses away from the eye, is too little to be of any advantage, therefore we must have lenses of different focal distances. If, however, you take a convex 2 and move 1 inch away from the eye it becomes convex one. The optical effect of this glass has been increased three thousand times more than in the former case. In this way the large focal intervals are compensated for by moving the glass a little farther away from the eye, thus the interval $\frac{1}{8}$ which exists between 2 and $2\frac{1}{4}$ can be divided up to meet any possible requirements.

The following table is taken from Mauthner; the glasses of the old and new system may be rapidly compared by referring to the table.

| OLD SYSTEM. Numbers in inches. | NEW SYSTEM. Numbers in dioptrics. | OLD SYSTEM. Numbers in inches. | NEW SYSTEM. Numbers in dioptrics. |
|--------------------------------------|---|--------------------------------------|---|
| (160) | 0.25 | 8 | 5. |
| 80 | 0.5 | 7½ | (5.25) |
| 60 | (0.67) | 7 | 5.5 |
| 50 | 0.75 | 6½ | 6. |
| 40 | 1. | 6 | 6.5 |
| 36 | (1.11) | (5¾) | 7. |
| 30 | 1.25 | 5½ | 7.5 |
| 24 | 1.5 | 5 | 8. |
| (22) | 1.75 | 4½ | 9. |
| 20 | 2. | 4 | 10. |
| 18 | 2.25 | 3¾ | 10.5 |
| 16 | 2.5 | 3½ | 11. |
| 14 | 2.75 | 3¼ | 12. |
| 13 | 3. | 3 | 13. |
| 12 | 3.25 | 2¾ | 14. |
| 11 | 3.5 | 2½ | 16. |
| 10 | 4. | 2¼ | 18. |
| 9 | 4.5 | 2 | 20. |

The Old or Inch System and the New or Metric System.



IN THE old or inch system a lens of one inch focal distance is the unit of comparison, and all other lenses have a greater focal distance but a less refractive index than their unit of measure.

In the old system the focal distance of lens No. 3 was 3 inches and its refractive index was $\frac{1}{3}$. In the new or metric system a lens whose focal distance is a meter is taken as the unit of measure, and the refractive index of this lens is 1—dioptric, the next lens is No. 1.25, or a refractive index of $1\frac{1}{4}$ dioptrics. The object of the new system is:

First.—To make the measure of glasses uniform throughout all civilized countries.

Second.—It was intended to make the focal interval more regular; this was, however, found impossible.

Third.—One of its most practical advantages are, the laity are not able to cheat the oculist or optician by finding through an accidental observation the number of the glass with which they see best, and then wander off and buy them at a street corner. For the practical oculist who has become accustomed to knowing the focal distance as well as the refractive index of a glass by a glance at its number, it is not as convenient as the old system. In the new system we know little or nothing about the focal distance of the glass. I think it would have been more fortunate if they had retained the same glasses (which they in fact have done), and measured their focal distances by the metric system. The reason for a small focal interval between

Opticians have a short method of estimating the value of lenses of the new system. They consider a lens, No. 36, equal to one dioptric, two No. 36 lenses equal to two dioptrics, or $\frac{1}{18}$ etc., the difference between the value thus obtained and the true values which are found in the tables are so small, that one can prescribe glasses according to this system and they will usually be satisfactory, although the difference in focus shows promptly in a focusing box. The method is, however, convenient, and the amount of error is illustrated by the following example:

Suppose 2 dioptrics is called for and you give $\frac{1}{25}$; $\frac{1}{25}$ is, however, the nearest corresponding glass—the difference between $\frac{1}{25}$ and $\frac{1}{20}$ is only $\frac{1}{500}$. This difference is rather too small to make much trouble.

A proportion of the people to whom one is obliged to exhibit his spectacles are dishonest and ready to take advantage of a person who is expert in selecting glasses. They will, under pretence that they wish to buy, draw out what you think is the proper number, and then, owing to a previous engagement, be obliged to leave, remarking they will call again. They go to the first street corner vender of spectacles and ask him for the number you thought was suitable. One who takes sufficient interest in the subject to familiarize himself with the new system will be able to protect himself perfectly against this class of customers by ordering his glasses marked in the metric system. Both systems are now so generally understood that one may use either method equally well in prescribing glasses.

Clock Work.

BY BRITISH HOROLOGIST.



SOME LITTLE time ago I gave a few remarks upon those clocks or timepieces which go without a pendulum, *i. e.*, those with the lever escapement. This kind of clock is chiefly of American production, but the clock we are now going to speak about is either French or Swiss, and is also regulated without the monotonous thud of a heavy pendulum. I allude to those timepieces with the cylinder escapement.

In this particular escapement, when used for larger timepieces than watches, it is astonishing the variety of methods which are employed, yet the same result is expected. This is one reason why I thought a few remarks upon this part of horology would not be out of place, and might, perhaps, prove beneficial to the reader. As a contrast, we will first notice that the chariot, cock, etc., are so placed in some that the last wheel in the train is a crown wheel, hence is made to work in the escape wheel pinion which is set at right angles with the crown wheel pinion, and, as a matter of course, the cylinder is also set the same way. Now, this is where the fault comes in, for it is quite natural that when the entire friction of the cylinder is only on the bottom part of the bottom pivot, the clock is sure to go faster than when the whole length of both pivots are more in contact with their jewel holes, which is always the case when the cylinder is parallel with all the pinions instead of *standing* upon one pivot only. Now, although there must of necessity be a very great difference in timing the clock in the two different positions, yet we find no difference in the strength of mainspring or any part of the train, which must be, and is, a very great mistake, for the result is simply this: the clock will gain time for the first few days after winding, and will then gradually go slower and slower until the mainspring is entirely exhausted. It is not very difficult to ascertain why it goes so fast at the first part of the time after winding, for then the whole tension of the spring is on, and as there is not sufficient friction on the point of one pivot to counteract this, the banking pin is almost sure to knock, and will continue to knock for the first few days until a part of the spring's pressure is exhausted. Now, in this case the knocking of the banking pin alone would cause the clock to gain time, even if the extra tension of the mainspring did not assist it to do so. Hence, on the whole, the result is anything but satisfactory, for such a clock can never be properly brought to time. I know of more than one clock now that is in the state here described, the owners, of course, ever wondering why their clocks do not keep time.

Having said this much about the fault (which is entirely through the want of a little forethought with the manufacturer), I will give as good a remedy as I can suggest to give the reader an idea of how these faults may be put to right, if he is willing to spend the time upon them. In the first place take out the cylinder and run the bottom pivot perfectly flat instead of leaving it with a round end, as they are mostly left, which only allows just one part of the pivot to be in contact with the endstone. By leaving this pivot flat at the bottom there is more surface in contact; hence, in a sense, more friction. I say this advisedly, as we are told by some theoretical critics that "friction is not in proportion to surface in contact." But, to some of us practical men, there are times when practical demonstrations seem to contradict theoretical formula. In this instance some would say that "the cylinder would require more force to whirl it backward and forward upon a flat bottom pivot, because part of the surface is so much farther from the center of rotation." Yes, I am aware of all this; but how can this get so far from the center without having surface in contact? There must be a surface of some sort to combine the outside to the center of rotation; yet if we were to cut away that part which joins the one to the other, the result would not, in this case, be the same; for there would not be so much surface in contact as if the entire pivot is left flat in a solid. Were

it turned out as here suggested, the outer ring left would be at the greatest distance from the center of rotation, and, according to theory, ought to have the required result by having retarding influence sufficient to overcome the whole tension of mainspring so that the banking pin would not knock. But is this the result when put into practice? Of course, there are different circumstances in this particular, for in some cases, perhaps, the above theory would be able to do what was required, while in others the whole pivot left flat would not be sufficient to retard the mainspring's force. In this case we must resort to other methods to effect a cure. We bipeds don't all require the same kind of medicine, neither do all horological instruments require the same kind of treatment. I wish sometimes that I was in possession of the grand panacea for all horological ailments. I have no doubt I should soon have plenty of customers ready to buy a copy of the receipt. But I am afraid this wonderful panacea is like the philosopher's stone, easier talked about than found. After all, we have in our horological laboratory many facilities for treating with all kinds of ailments which watches and clocks are heir to.

Well, our next method in order to try and get the clock to be a uniform timekeeper is to change the mainspring for one well finished and not quite so strong as the original one. Perhaps some will say "why not do this before we go to the trouble of flattening the bottom pivot?" Just this; when a pivot is working only upon the bottom it is best to have a flat surface to work upon, as the balance is then oscillated with more uniformity, even when the mainspring is not exactly uniform in its pressure; therefore we do no harm—but good—by making the bottom pivot flat, and this alone will sometimes be sufficient to cure the fault of the banking knocking if nothing else.

To my mind, when such strong mainsprings are used as we generally see in this class of timepiece, neither of the jewel holes or pivots should be so small as they usually are. Fancy such small pivots as are mostly seen upon the escape wheel pinion being driven by such a strong mainspring. If we allow the clock to run down while the escape wheel is in place, we are very liable to find one or both pivots broken off before it gets run down. I think all such pivots ought to be sufficiently strong to stand the pressure of the mainspring through the train of wheels without coming to grief. But there is another reason why these pivots are liable to get broken off while letting the train run down; that is, the badly pitched depth we often find in the crown wheel and escape wheel pinion. We frequently find too much end shake to the crown wheel which, while resting upon one shoulder, puts the depth too deep, and on the other shoulder the depth is too shallow. Now, when the train is running rapidly this crown wheel is so jumping about in the escape wheel pinion, that the roughness of the running all helps to break off the escape wheel pivots. The best way to correct this depth is to notice how the screws fit in the cylinder plate—for these screws have to act as steady pins as well. If the holes where the screws go through are at all large, we then notice which would be the most convenient side to screw it secure in order to put a collet upon the shoulder of crown wheel so that the depth will be right by making the end shake right with only fixing a collet to one shoulder. This depth, when correct, will also cause a more uniform pressure upon the escapement, and help to make the clock keep better time. We are supposing that this crown wheel is perfectly true, or it is not much use trying to correct the depth as mentioned above, for even if the end shake be ever so exact and the wheel teeth are out of true, we shall never get the depth to act as it ought, neither can the clock be depended upon for keeping going regardless of keeping time. When this crown wheel is out of truth it is best to rivet it true, not do as I have seen it done, placed in the turns and topped true, and then the teeth rounded up by hand. This method simply means a faulty depth after all, for in topping the teeth, those teeth which require the most topping will, when they are finished, be shorter from the top to the base than those which do not get topped so much; therefore, some of the teeth are longer than the others while the shorter ones are thicker; for when the wheel was originally cut the

teeth were all cut alike. These remarks will apply to several kinds of wheels; for whenever a wheel is topped to put it true we may depend we are making a very faulty wheel of it unless we have a proper wheel cutting machine. In some of these clocks it is not only the crown wheel, but frequently the escape wheel has too much end shake. The former, as I have said, can be corrected by making a small collet that will just fit over pivot, fasten it on with a piece of soft solder, place the wheel in the turns and turn the collet down until it is the same size as the other part of the arbor, then turn off the end to the exact place for the end shake to be right. If it is properly done and a steel collet used, it will not be detected that a collet has been put on. Now, when the escape wheel end shake is wrong we have to proceed differently under different circumstances, for we must notice in the first place how the teeth are acting in the cylinder slot. Suppose, when the escape wheel is resting upon its bottom shoulder, the cylinder will ride upon the plane of the wheel, which will cause it to kick or give the wheel a trembling motion, then we know that the cylinder is too low for the wheel; therefore, we have not only to lower the escape top cock in order to correct the end shake, but we must also drive the bottom cylinder plug out a little in order to raise the cylinder sufficient to free it from the plane of the wheel. Now, if the end shake of cylinder is correct previous to this, we shall now either have to raise the cock or drive the top plug in a little. But suppose the end shake of escape pinion is excessive, and is, when the bottom shoulder is resting on the jewel, a little too low so that the bottom of the escape wheel runs foul of the cylinder shell; in this case we simply drive out the steady pins from bottom escape wheel cock and file a piece off the cock, leaving it perfectly flat when we have got enough off. We then insert the steady pins again, screw it down, and, if the end shake is right, the escapement is mostly free and right also. These clocks are very good for the novice to exercise his skill in order to thoroughly understand the workings of the horizontal escapement. He is better able to see how the different parts act with each other than he is in the small watch. When the escape is correct he will find that the plane of escape wheel will work just in the center of small slot in cylinder.

If he will notice how the teeth stand in the cylinder when the banking pin is held firmly upon the fixed banking pin, it will give him an idea of how this should be. At one side the lip of cylinder is just about to touch the inside of escape tooth, but the banking pin just prevents it from doing so, while on the other side the cylinder goes round just far enough to let the point of next tooth just get on the edge of slot, but it cannot get in owing to the intervention of the banking pin. If this is allowed to get in the slot just here we then have what is called "a locking," which is, in reality, an overturned banking. If the other side is so that the banking pin does not stop it soon enough, the edge of slot knocks upon the inside of teeth and causes a trembling of escape wheel, while the clock left in this form will never keep very good time. We may easily remedy this by taking off the hair spring collet; hold the brass of cylinder firmly in plyers, and with the left hand turn the balance a little outwards; this will bring the banking pins in contact before the cylinder touches the inside of wheel teeth, and all is right, providing we are careful in not doing it too much; if so, we shall find the banking knock—a fault which is quite as bad, if not worse, than the one we are trying to remedy. These particulars are the most important of anything in connection with the cylinder escapement. Yet, as this kind of clock is now being made up at such a low price, these seeming little items are frequently overlooked; hence, when they get into the hands of the inexperienced, there is often more trouble with them than there need be if they knew where to look for some of the faults which I have been endeavoring to bring to light. There are several other things in connection with this particular clock, but we will not comment further just now, as we have already given a rather lengthy lesson upon this somewhat neglected member of the horological fraternity.—*The Jeweler and Metal Worker* (London).

Facts and Fables About Gems.



THE FOLLOWING is one of the many articles circulating through the press of the country regarding precious stones. It contains fact and fiction in proportions in favor of the fiction, but as it contains some anecdotes and references to popular superstitions, we give it place, without endorsing any of the statements:

The great beauty and value of the various kinds of precious stones have in all ages led men to look upon them with a feeling almost of reverence. A magnificent diamond or ruby, or a star sapphire of unusual splendor, has a sort of individuality; it is unique of its kind; it has its history; men can trace it back from one possessor to another to the mine from whence it came, and thus has a story which often, indeed, is varied and sometimes darkened with crimes and blood. The history of the great diamonds of the world is so black a record that no surprise can be felt at the very common notion that the possession of a noted diamond is certain to bring ill fortune. So thoroughly was this idea ingrained in the Oriental mind that the Persians had a tradition that when God made the world He made no gold, silver, diamonds, nor other precious stones of any variety whatever; but after Satan had carefully observed the tendencies and capabilities of the human mind he cast about for the best means of tempting man to evil, and, finding that Eve passionately admired the flowers of bright hues, he attempted to imitate these in earth, and thus produced diamonds and other precious stones. The Almighty, observing what Satan had done, decreed that these jewels should forever bring the favor of God and man to their possessors, when Satan at once put into every man's mind a passionate desire to obtain these as ornaments, and thus sprang up every form of evil. So, primarily, all kinds of jewels represent a contest between the spirit of good and the spirit of evil, the latter finally obtaining the victory.

DIAMOND HISTORY.

In the Orient the diamond has always been a symbol of power, and scarce a page can be turned which is not splashed with bloodshed in some quarrel or other about a diamond. Numberless were the homes desolated by strifes over these jewels, innumerable the wars waged on their account, and many a life was made accursed instead of blessed by the ownership of a diamond. There are some times pleasing contrasts, of course—occasionally a slave obtained his freedom, sometimes a patient toiler would be rewarded, but the larger part of the record is far from bright. No bit of history better illustrates the general bloody tinge which colors the records of the diamond than the narrative of the Moon of Mountains, a great diamond now among the Russian Imperial regalia. Its first appearance is among the jewels of the Mogul Emperors, and its real history begins when Nadir Shah overran their empire and carried the millions of their treasures to Persia. After he was murdered and his booty scattered among his troops, an Afghan soldier, formerly of his body guard, turned up in Bassorah, on the Persian Gulf, with a large number of precious stones, and among them this diamond. He sold the diamond and other stones to a Jew for £500 and two horses, and set about spending the money at Bagdad. A merchant, who knew of the transaction, tried to buy of the Jew, who refused to sell, upon which Shaffras, the merchant, and his two brothers, murdered him and poisoned the Afghan trooper and threw their bodies in the Tigris. The three brothers quarreled over the diamond, each wanting it, and that night another sack containing the bodies of his two brothers rested quietly at the bottom of the river. Shaffras fled from Bagdad to Constantinople, thence to Russia, thence to Paris, where he sold the diamond to a Russian agent, and was soon afterward poisoned by one of his daughters to get possession of the purchase money.

MISCELLANEOUS CRIMES.

The Moon of Mountains is not solitary in its tale of blood, for almost every other great diamond has a history equally bloody. The Kohinoor is so well known as a jewel that a bare reference to it is necessary to recall much of its wonderful story, but most people do not know that this story comprises no less than fifty-two known murders—how many others is uncertain—three, and perhaps four, wars, and an incalculable number of lies, duplicities and treacheries of more or less serious result. The stone has never, until it came into English hands, brought anything but misfortune to its possessor, and yet every holder, who perhaps got it by robbery or murder, or both, considered it a sure talisman of fortune, and clung to it with desperation as long as he could. According to one account—perhaps one as reputable as any other—it was discovered in India nearly 5,000 years ago, and has been like a devil in the world ever since, bringing nothing but strife and bloodshed wherever it has gone. One of its owners, Shah Rokh, the son of Nadir Shah, refused to give it up to the conqueror of his country, and had his eyes put out; this not accomplishing the desired end, the barbarous conquerors had Rokh's head shaved, a diadem of paste put on, and in the hollow thus formed poured boiling oil for the purpose of inducing compliance. The wretched Rokh went mad under his suffering, but never gave up his secret. He had hidden the gem in the plaster of his palace wall, where it remained for many years, and was believed to be lost forever, but where it was finally discovered by an officer cutting his hand on its sharp corner, where the plaster had worn away from it. Another celebrated diamond was brought from the East in the leg of a slave, who murdered his master for it, then hid it in a gash in his leg, waited for the cut to heal, and traveled to Europe as a beggar. So identified are diamonds with every species of crime that these gems have been rather a curse than a blessing. It is calculated that in the Brazilian mines at least one-third of the stones are frequently disposed of in one way or another, and murders are so frequent in the diggings that they almost cease to excite more than a passing remark.

MAGICAL POWERS OF GEMS.

The precious stones were probably first desired because of their beauty, then, as they were scarce and difficult to obtain, it was an easy matter to imagine that their possession gave some superhuman power to the owner. They themselves were believed to be supernatural, and therefore he who could obtain them was destined to be more fortunate than other men. This step once taken, it was an easy matter to assign various virtues or powers to different kinds of gems, and the system of symbolization is complete. In very ancient times these ideas had a considerable growth, and Theophrastus and Pliny both attributed magical powers to all kinds of gems, assigning them influence over health and beauty, riches, honor and fortune and life. In ancient times the system was tolerably complete, in fact as full as to-day, though for us the same gems no longer indicate the same things. The ancient Persians believed that spinelle gave joy to the owner, and was a sure protection against bad dreams, while the Indians were absolutely certain that a traveler who carried a large diamond as a talisman would return in safety to his home. The ruby was also a talisman seldom exhibited even to the most intimate friends, since, if kept hidden, it preserved one's friendships; if exhibited, it severed them. The emerald in Peru was an emblem of the God of the Sea, and was worshipped as such, while in several countries the agate and jasper have been considered charms against spiders and scorpions, a jasper amulet in ancient times being also supposed to bring success to athletes. In contests of athletic skill in France and Rome it was not unfrequently provided that all contestants should alike be deprived of their charms, and numerous devices were resorted to by the runners and wrestlers to conceal their amulets about their persons. The amethyst was a sure preventive of intoxication, since wine from an amethyst cup lost its strength while retaining every other property.

PROPHETIC AND MEDICAL STONES.

Epiphanius has a curious story concerning the Urim and Thummim, which seems rather probable than not. He says that when the Jewish High Priest entered the Holy of Holies he wore over the breastplate the "Declaration Stone," as he translates the Urim and Thummim. This was either a blue diamond or a sapphire, which, by its change of color, was believed to indicate the pleasure or wrath of Jehovah. When the Almighty had determined to send a pestilence the gem turned black; before war the stone was red as blood; before coming prosperity it was of a sparkling blue, with a five-pointed star shining in its depths. Diamonds which have been in one family for several generations are good divining stones, according to another superstition, since they become attached to the family, and indicate by their color and brightness what may be in store for the family. Of medical stones, or stones having curative properties, there are not a few, and during the Middle Ages the people believed more devoutly in these gems than in the existence of God. Chalcedony blessed and tied round the neck was, in those days, a sure cure for lunacy, and when Mars armed and a virgin robed holding out a laurel were engraved on it, it was a sovereign specific for many other things also. The beryl was also a healing stone when treated as follows: Take a beryl, engrave upon it a lobster, under its legs engrave a raven, beneath the stone put a vervan leaf in a plate of gold, consecrate it, and it makes the bearer proof against all bad things, particularly against his own evil passions, and specially against diseases of the eyes. The sard is a love stone, worn by gallants to obtain the favor of women, while a great many jewels are certain to procure a prisoner his liberty, the main thing being for him to first get them. There are several stones, like the beryl, good for the eyes; the emerald was one. Invalids, in mediæval times, used sometimes to throw it into their drinking water to aid digestion, and as a ring stone it was a preventive of epilepsy. The true Oriental ruby was a prophetic stone like the diamond, with this difference, that the ruby foretold only for the individual, while the diamond looked after the entire family. The powder of pearls, emeralds and other precious stones was a sure cure for fevers of every kind, while cornelian and several other stones made the wearer strong and courageous. Lapislazuli cured boils and eruptions of the skin, while the diamond, though its dust was a deadly poison, was a sure antidote to every other poison.

ENGRAVED STONES.

Among the people of ancient and mediæval times the art of grav- ing on gems was carried to no small degree of excellence, and a special virtue was supposed to dwell in the engraved stone which did not belong to it when not so ornamented. For instance, the jasper was a stone having curative properties, but when engraved with a cock, the bird sacred to Æsculapius, there were few diseases which would not yield to its power. The Median stone was a preventive of general debility, but when engraved with a figure of Hercules and worn as a ring stone it was a sovereign remedy for colic. Many stones were, on general principles, good as amulets, but when engraved were a sure safeguard against demons, witches and hobgoblins of every description. It is quite possible that the rarity of these engraved stones may have had something to do with the wonderful virtues attributed to them, since, though ancient engraved stones seem to be rather plentiful, yet in fact they were by no means so numerous as they seemed to be. The possessor of one of these ancient cameos or intaglios was undoubtedly much envied by his less fortunate neighbors, and to exaggerate his own good fortune would be very prone to boast of his own superior success in any particular direction and attribute it to his magical gem. Thus easily might a tradition of this kind be started, which in a generation or two might be received as an undoubted fact. Nor would it matter

much if all the circumstances seemed to contradict the legend ; it is easier to turn the course of a river than to make people believe something contrary to their wishes. So engraved stones have always been fortunate, and probably always will be.

CHARM STONES.

In the tenth century the business of amulet wearing was better understood than ever before or perhaps since, and at all events men knew exactly the powers and virtues of the different amulets, and settled them as definitely as the laws of the Medes and Persians. From old records of those days it is learned that a man's head with a long beard and a little blood round the neck, carved on a diamond, was certain to confer victory on the wearer, to endow him with courage, to defend his body from all harm, to turn aside swords, spears and arrows, to prevent one drowning in the water or burning in the fire, to save from shipwreck and ward off every kind of pestilence. All this was very satisfactory, but in the whole affair there is one serious drawback—nobody had ever seen a diamond engraved in that way, and so no one knew how many more wonders such an amulet might not work if there were only such an one. A wide field was thus left for speculation, and men who enjoyed unusual success or made hairbreadth escapes were often credited with such a diamond amulet, and sometimes lied about it and claimed their success was due to it ; and, when finally overtaken by their fate and no amulet was found upon their bodies, its very absence was a full explanation of the disaster. The torch, or a virgin on crystal, was an amulet for the eyes, while a man making a speech as a subject on a ruby was certain means for gaining honor and riches. A sapphire engraved with a man playing on some musical instrument was a place hunter's amulet, which had power to raise him to positions of honor and dignity, and to give him favor with all men of his acquaintance. A greyhound on beryl had much of the same power, with the additional advantage that it was certain to gain for the wearer the friendship of every one he met.

MISCELLANEOUS AMULETS.

One of the most potent amulets was the agate with three dancing maidens engraved on it. This rendered the wearer generally acceptable, and, if a cock were added, it gave power over the spirits of the air, and was believed to be potent to summon the spirits of the vasty deep. An amulet of garnet with a lion engraved upon it gave courage, cheered the heart and caused sorrow and sighing to flee away. Either a serpent or a stag engraved on onyx was efficacious both to invoke or drive away devils, spirits, witches, ghosts and supernatural beings generally, while it also had the power to bind, restrain or turn aside poisonous or adverse winds. An emerald engraved with a merchant carrying his wares gave wealth, while a bull engraved on a loadstone protected the wearer in all dangerous places and against all spells and witchcraft. It was also efficacious in bringing the traveler home again from distant countries and across stormy seas, and, having the additional advantage of being comparatively cheap, this species of amulet was much worn. A jasper engraved with a wolf or horse was a preventive of fevers of every kind, and was also believed to staunch a flow of blood. A crowned figure on a topaz made the owner good, dignified and honored in the sight of all men. An armed man holding a sword on the sard gave the wearer a good memory and enabled him to get wisdom, while a goat on a chalcedony, so long as it was kept in the money box, was sure to make the owner's riches increase.

JEWISH LOVE OF GEMS.

The Jews of old had a profound reverence for almost all kinds of gems and precious stones, and so highly did they esteem things of this kind that when a Hebrew went away from home the greater portion of his wealth was usually in gems of some kind, since these might be easily converted into money. On one occasion the desire

to attain valuables of this description was so strong that, according to their own records, they borrowed a large supply from the Egyptians and neglected to repay the loans thus contracted. The sacred writings contain many proofs of the great esteem in which jewels of various kinds were held, and many stories among the commentators on the law confirm the opinion that has already been expressed. The twelve tribes had each a stone sacred to it, the hyacinth being consecrated to Dan, the amethyst to God, and the jasper to Benjamin. The tribe of Issachar cherished the sapphire, particularly the star sapphire, while the agate was holy to Naphtali and the emerald to Levi. Zebulon had the onyx, Reuben the cornelian, and Asher the chrysolite. The beryl was sacred to Joseph, while Simeon had the topaz, and Judah, the largest and proudest tribe of all, had the ruby. In pursuance, probably, of the same idea, the Christian Church, in early times, consecrated certain jewels to the apostles, and as the church grew in wealth it often happened that churches dedicated to particular apostles invested largely in the gems sacred to the patron of the church. The jasper was sacred to Peter, the sapphire to Andrew, the chalcedony to James, and the emerald to John, his brother. Philip loved the sardonyx, while the cornelian was holy to Bartholomew, and the chrysolite to Matthew. The beryl was dedicated to Thomas, and the chrysoprase to Thaddeus. James the Less had the topaz, Simeon the hyacinth, and Matthias the amethyst. This assignment of the various precious stones to the apostles is probably due to a passage in Revelations, in which the New Jerusalem is represented as being founded upon the various jewels mentioned.

GEMS OF THE MONTH.

In more modern times each month has had a gem consecrated to it, and the wearing of a particular precious stone, as a talisman, by a lady born in a given month, is supposed to be more than usually fortunate. The system of divining applies only to women, and theoretically is infallible. She who is born in January should wear only garnets, which will insure her the friendship and fidelity of her associates, and will also render her true to them. Those born in February must wear the amethyst, which will make them sincere with others, and will make others candid with them, and will insure them against poisons, passions and cares. Those whose birthday falls in March will be assisted in these qualities by wearing a bloodstone. The diamond is sacred to April, and will keep her who was born in that month innocent till death, while the lady born in May should wear an emerald, which will be certain to make her a loved and happy wife. Those born in June should wear an agate to bring them health, wealth, peace of mind and long life, while the ruby clears away the doubts, anxieties and pangs of love for those born in July. The sardonyx is for those born in August ; with it as a finger ring they are absolutely certain to gain husbands and happiness ; without it they are bound to live alone and to die unwept, unhonored and unsung. The sapphire is good to prevent or cure insanity, and is especially beneficial to those born in September, while the topaz, an emblem of friendship and love, is dear to those who first see the light in November, and the turquoise, the emblem of success, must be worn by those whose birthday comes in December. The superstitious reverence with which jewels are often regarded also appears in the habit almost universal in the East of naming the more valuable stones. The Kohinoor and the Kohitoor are examples too well known to need more than mention, but there are scores of others. The treasuries of the East from the earliest times have abounded with diamonds. There were the Sea of Fire, the River of Light, and the Son of God, the Eye of God, and the Star of Gabriel, the Ocean of Love and the Mountain of Beauty, the Delight of Woman, the Pleasure of the King, the Delight of the Eyes, and the Pride of the Treasury, the Boast of the River, the Soul of the Queen, and the Star of the Ocean. Nor were diamonds alone in being named, since other stones were often equally favored in this way, and the superstitious reverence felt for them is quite clearly manifest.

Foreign Gossip.

NEW SILVER MINE.—A silver mine has recently been discovered near Rovigo, Algeria.

METEOROLOGICAL.—It appears from observations of the new apparatus in use at Greenwich, England, for recording the readings of thermometers, that the average range of temperature during the day is less at twenty feet above the ground than it is at four feet.

THE AFRICAN DIAMOND MINES.—The large mines are losing quite extensively and companies are merging into each other. The process of amalgamation in the De Beer's mine still goes on, the Victoria Diamond Mining Company having purchased four claims for the sum of £10,000.

AN AURIFEROUS TOWN.—The ordinary paragrapher of the daily press has fearful and wonderful conceptions. The following is his latest: "The ground upon which the town of Shasta, California, stands is so auriferous, that after each violent rain small pieces of gold lie about upon the streets."

TREASURE TROVE.—A treasure of the time of the Hohenstauffens, Germany, was recently found upon Monte Berico, near Vicenza, by several workmen and secretly conveyed away. Several boxes with costly vessels and coins, bearing Barbarossa's head, were found. The workmen tried secretly to sell the valuable articles, but the fiscal officer was informed of it and he seized the entire find.

NEW ALLOY.—The formula of a new alloy is given in *Nature*, which is especially adapted to many important uses in the arts. It melts at the low temperature of moderately hot water, and considerably below that at which the magic spoons of long ago melted in a cup of tea. Its composition is as follows: Bismuth, 48 parts; cadmium, 13 parts; lead, 19 parts; tin, 20 parts. It is said that this alloy will withstand quite a severe pressure.

A REMARKABLE DISCOVERY.—A quantity of Roman coins were recently found in Milverton, a suburb of Leamington, England. Workmen were excavating an old foundation when they found a Roman ampore, containing between 200 to 300 silver and copper coins of the oldest time and in an excellent condition. The workmen, ignorant of the great value of the find, broke the vessel to see what it contained and left the coins, which doubtless are of a great antiquarian value, lie scattered upon the ground where they were found afterward.

THE SOLOMON ISLAND CORAL REEFS.—At the last meeting of the Edinburgh Royal Society, Dr. John Murray submitted an interesting paper on the coral reefs of Solomon Islands, in which, among other subjects, an account was given of the relations of the animals living upon the reefs, in particular a small crab, which finds its home among the branching millipora, whose body takes the color of the coral bed, and whose claws, held up for prey, take the bright red color and markings of the coral branches, from which they can scarcely be distinguished.

ANOTHER ALUMINUM PROCESS.—A new claimant for the honor of furnishing the mechanic arts with cheap aluminum and alloys of this metal has just appeared. The name of the claimant is the Columbia Co., of Springfield, Mass., which, in a recent circular letter, presents its compliments, and begs to state that it is now in readiness to furnish the metal aluminum and all its alloys to any amount that may be desired. The letter gives no information as to the method of reduction practiced, nor of the price at which it proposes to furnish the metal and its alloys. We shall await with interest further information of the company's claims. There is plenty of room in this field for many competitors, and though the brothers Cowles thus far seem to be the only inventors who have devised a process that gives much promise of success, it would be reckless to hazard the statement that their's is the only solution of the problem. We hope the new company's claim may prove to be well founded.

GOLD WASHINGS IN ITALY.—Washing for gold has been practiced from time immemorial in Piedmont, in the beds of some of the torrents which flow from the Alps to the Po, says the *Journal of the Society of Arts*. Of late years, however, the existence of these auriferous sands has been more fully investigated, and they have been found to extend to the foot of the Alps from Legin and St. Maurizio, an extent of about 250,000 acres. An Italian company has lately been formed to work the mines systematically.

A SIMPLE ALARM.—A correspondent of the *English Electrical Review* suggests that a simple alarm contrivance may be made by cutting a small groove in the front, or bezel, of a common watch, to allow a wire, insulated from the case but bare at the end, to pass through; the wire, being connected with a bell circuit and lying close to the face of the watch, may be arranged to come in contact with the hour hand, and so complete the circuit at seven or eight o'clock, or any hour required, and the bell will continue to ring until the wire is removed.

AN AFFECTING SCENE.—Immediately after the baptism of the young King of Spain, an affecting scene took place in the rooms of the queen-regent. A short time before the death of the king, he secretly ordered a very handsome and costly pearl necklace to be made which he desired to present to the queen on the baptismal day. This order was continued to be guarded as a secret after his death, and immediately after the baptism of the young king, the Infanta Isabella, the oldest sister of Alfonso, went to the room of the queen, and amidst the tears of all handed her the present in the name of her brother.

THE INVENTOR OF THE AIR PUMP.—On May 11 last it was just 200 years since the inventor of the air pump, Madgeburg spheres and various other natural philosophical apparatus, Otto von Guericke, died. He was one of the most eminent scientists of the century. Born November 20, 1602, at Madgeburg, where his father was burgo-master, he studied jurisprudence, mathematics, physics, etc., and was, on the death of his father, elected mayor of the same city. Although he lived in the troubled time of the 30 years' war, and was mayor when the city was sacked under Tilly, he endeavored to devote his leisure hours to the pursuit of art and science, which owe him the invention of two highly useful apparatus, the air pump and the electricity machine.

AN ETRUSCAN GRAVE.—The royal Italian inspector of excavations, Isidoro Falchi, found in the recently discovered Etruscan town, Vetulonia, the most celebrated of all, near Grosseto, Tuscany, a grave of phenomenal wealth. It contained about forty terra-cotta vases of exceptional beauty and the most varying forms, several of them bearing admirable reliefs. One contains a lengthy inscription in Etruscan characters. Falchi found beside this twenty large, handsomely ornamented bronze and five silver vases, one of which finely chased (*ciselé*), several gold articles, a great number of arms, both of bronze and iron, a completely ornamented shield and a large quantity of other articles, among which a set of wheels for a wagon, bridle-bits and harness, utensils of glass, amber and ivory, etc.

THE BALLARAT GOLD MINES.—Perhaps no gold mines in the world have furnished as much gold in so short a space of time as the Ballarat (Australia) mines. In the olden times fortunes were sometimes made in a few days with no other tools than a pick, a shovel and a tin wash basin. In one claim alone, only a few feet square, a man and his son took out \$300,000 in a little over a week's work. The "Welcome" nugget, found in 1858, of which a model is exhibited in the Victoria Court, was sold for \$52,500. In another claim one tubful of wash dirt yielded \$16,175. These were all surface workings, but experience has shown that the deep ground at Ballarat is almost equally valuable. The alluvial diggings are still carried on at a depth, in many instances, of several hundred feet, and sometimes considerably deeper. Some of these underground alluvial workings extend over an enormous area, and, having yielded heavy dividends for many years past, still continue to pay handsomely.

Workshop Notes.

GUM FOR BACKING LABELS.—Mix pure dextrine with boiling water until it assumes the consistency of ordinary mucilage. Apply with a full, evenly made camel's hair brush. The paper should not be too thin or unsized.

FIRE PROOF CEMENT.—A very tenacious and fire proof cement for metals is said to be made by mixing pulverized asbestos with watergloss, to be had in any drug store; it is said to be steam tight and resist any temperature.

GERMAN SILVER.—An excellent German silver is prepared by melting in a crucible 55 parts copper, 23 nickel, 17 zinc, 3 iron and 2 tin. This composition is in every respect equal to silver in appearance, fully as hard and not vitreous.

TO WHITEN IRON.—To render iron as white and as beautiful as silver, take ammoniacal salt in powder and mix it with an equal quantity of quicksilver. Dissolve in cold water and mix well. When done, immerse the red heated metal in this bath and it will become as white as silver. Have a care not to burn the article by overheating.

WAXED PAPER.—Paper saturated with wax, paraffine or stearin is very useful for wrapping up articles which should be kept dry and not exposed to the air. Place a sheet of stout paper on a heated iron plate, and over this place the sheets of unglazed paper—tissue paper does very well—that are to be waxed. Enclose the wax or paraffine in a piece of muslin, and as it melts spread it evenly on the paper.

PATINA.—An imitation of patina for bronze objects of all kinds can be produced by preparing a paint of carbonate of copper and any light alcoholic varnish, and applying it to the object with a brush. This green color penetrates the smallest recesses and has, when dry, the appearance of patina. Carbonate of copper gives a blue patina, verdigris a light green, and intermediate shades of color can be obtained by mixing the two.

TO HARDEN STEEL.—A very fine preparation for making steel very hard is composed of wheat flour, salt and water, using, say, two teaspoonfuls of water, one-half teaspoonful of flour and one of salt; heat the steel to be hardened enough to coat it with the paste by immersing it in the composition, after which heat it to a cherry red and plunge it into cold water. If properly done the steel will come out with a beautiful white surface. It is said that Stub files are hardened in this manner.

GOLD COLORED LACQUER.—The following is a good recipe for a lacquer that will put a gold color on a copper-plated work. One gallon methylic alcohol, ten ounces of bruised seed lac and one-half ounce of red Sanders' wood; dissolve and strain. A deep gold lacquer can be prepared of three ounces; seed-lac turmeric, one ounce; dragon's blood, one-quarter ounce; alcohol, one pint. Digest for a week, frequently shaking, decant and filter. By using a dilute solution of the latter, or by increasing the color of the former, the exact shade desired can be obtained.

CEMENTING BRASS ON GLASS.—Puscher recommends a resin soap for this purpose, made by boiling 1 part of caustic soda, 3 parts of colophonium (resin) in 5 parts of water, and kneading into it half the quantity of plaster of Paris. This cement is useful for fastening the brass tops on glass lamps, as it is very strong, is not acted on by petroleum, bears heat very well and hardens in one-half to three-quarters of an hour. By substituting zinc white, white lead or air-slaked lime instead of plaster of Paris, it hardens more slowly. Water attacks only the surface of this cement. Wiederbold recommends for the same purpose a fusible metal composed of 4 parts of lead, 2 parts tin and $2\frac{1}{2}$ parts bismuth, which melts at 212° F. The melted metal is poured into the capsule, the glass pressed into it, and then allowed to cool slowly in a warm place.

TO POLISH STEEL.—Take crocus of tin oxide and graduate it in the same way as in preparing diamond dust, and apply it to the steel by means of a piece of soft iron or bell metal, made in proper shape, and prepared with flour of emery, same as for pivot burnishers; use the coarsest of the crocus first and finish off with the finest. To iron or steel a better finish can be given by burnishing than can be imparted by the use of polishing powders of any kind whatever. The German method of polishing steel is performed by the use of crocus on a buff wheel. Nothing can exceed the surpassing beauty imparted to steel or even cast iron by this process.

THE ACTION OF THE BALANCE.—The force of the mass of the balance in revolving winds up the reciprocating spring, and as soon as this spring has secreted all the force of the balance, the motion is reciprocated by the uncoiling of the spring. Arrived at the place of the escapement arc (where the lever is lying at the proper angle against one of the banking pins) the stone pin of the roller enters the lever notch, and the reciprocated force of the balance, by the aid of the roller pin, now moves around the lever and pallets sufficiently far to draw the locking out from under the scape wheel tooth, and all the mechanism then being set free, the escape wheel moves forward again over the impulse plane of the opposite pallet, giving another impulse to the pieces, and again another tooth of the wheel drops on to the opposite locking, the wheel resting there and stopping all the machinery while the roller and balance vibrate freely as before.

TO PAINT THE HOURS ON METAL DIALS.—The black coloring matter is the soot obtained by holding a clean copper or sheet metal plate over the flame of an oil or petroleum lamp (a glowing tool serves the purpose very well). As soon as a sufficient deposit is produced it is collected on a piece of glass, care being taken not to mix any foreign substance with it. A few drops of essence of lavender are then poured on the soot and the mixture pounded with a spatula. This done, just sufficient copal varnish is added to give the composition a proper thickness, so as to prevent it spreading, when applied. The varnish thus prepared is put on by means of a very fine brush. To secure brilliancy, the dial is dried at a slow heat by passing it lightly over a spirit flame, the reverse side of the dial being, of course, the only part exposed to the flame. This composition must be made in quantities large enough for present use only, as it dries very rapidly and cannot be utilized afterward. To secure good results this process requires some experience, which can only be obtained by careful experiments. The painting, especially, requires a certain aptitude and lightness of hand, which may, however, soon be attained by strict attention.

UTILIZING NICKEL SCRAP.—A correspondent asks: "What method do you recommend as the simplest for utilizing the nickel scrap that accumulates in the plating bath from the anodes?" Collect the scrap in a porcelain dish, and, after several washings with hot water, cover it with dilute sulphuric acid and boil. Iron, copper and other impurities will be dissolved. Pour the acid off and wash the scrap again with water. Then dissolve the nickel in nitric acid over the water bath or by some other gentle application of heat. When solution is complete evaporate to dryness. Then dissolve the nitrate thus formed by the addition of sufficient distilled water and with the aid of heat; precipitate the nickel as hydrated oxide by the addition of caustic soda (or as hydrated carbonate by the addition of carbonate of sodium); wash repeatedly by decantation with boiling water, and dissolve the washed precipitate in just enough moderately dilute sulphuric acid to effect solution. Evaporate the resulting solution of nickel sulphate until a concentrated solution results, which point can be ascertained by the commencement of crystallization, and add an *excess* of a concentrated solution of ammonium sulphate. A dark-green granular precipitate will be thrown down, which is the double sulphate of nickel and ammonia, commonly employed for nickel-plating by what is known as the Adams process. If the supernatant liquid still appears green after the precipitate has separated, add more ammonium sulphate from time to time until it has become colorless. All the nickel has then been separated. The liquid can then be poured off, and the salt may at once be dissolved in water and used in the plating bath.

A Visit to the Shop of M. Bourguignon.



ONE OF THE most curious sights in Paris, or, indeed, in the whole world, is afforded by a visit to the vast workshops of M. Bourguignon, situated at the Barrière du Trone, where the whole process of transforming a few grains of dirty, heavy-looking sand into a diamond of the purest water is daily going on, with the avowed purpose of deceiving everybody but the buyer. The sand employed, and upon which everything depends, is found in the forests of Fontainebleau, and enjoys so great a reputation in the trade that large quantities are exported. The coloring matter for imitating emerald, rubies and sapphires is entirely mineral, and has been brought to high perfection by M. Bourguignon. He maintains in constant employment about a hundred workmen, beside a number of women and young girls, whose business it is to polish the colored stones and line the false pearls with fish-scales and wax. The scales of the roach and dace are chiefly employed for this purpose, and form a considerable source of profit to the fishermen of the Seine, in the environs of Corbeil, who bring them to Paris in large quantities during the season. They must be stripped from the fish when living, or the glistening hue which we admire so much in the real pearl cannot be imitated. It is, however, to the "cultivation" of the diamond that M. Bourguignon has devoted the whole of his ingenuity, and were he to detail the mysteries of his craft, some of the most singular histories of "family diamonds" and "heirlooms" would be brought to light. A few months ago a lady entered his shop, looking rather flushed and excited, and drawing from her muff a number of morocco cases of many shapes and sizes, opened them one after another and spread them out on the counter. "I wish to learn the price of a *parure* to be made in exact imitation of this," she said; "that is to say, if you can imitate the workmanship with sufficient precision for the distinction never to be observed." Bourguignon examined the articles attentively, named his price, and gave the most unequivocal promise that the *parure* should be an exact counterpart of the one before him. The lady insisted again. She was urgent overmuch, as is the case with the fair sex in general. Was he sure the imitation would be perfect? Had he observed the beauty and purity of these stones? Could he imitate the peculiar manner in which they were cut, etc.? "*Soyez tranquille, madame,*" replied Bourguignon, "the same workman shall have the job, and you may rely upon an exact counterpart of his former work." The lady opened her eyes in astonishment and trepidation, and M. Bourguignon, with unconscious serenity, added, by way of reassuring her: "I will attend to the order myself, as I did when I received the commands of the gentleman who ordered this very *parure*, I think, last February," and, with the greatest unconcern, he proceeded to search his ledger to ascertain which of the workmen executed it, and what the date of its delivery.

Not only, however, is domestic deception carried on by means of M. Bourguignon's artistic skill, but he has often been called upon to lend his aid to diplomatic craft likewise. Numberless are the snuff boxes "adorned with valuable diamonds," which issue from his *atelier* in secret as the reward of public service or skillful negotiation; innumerable portraits, "set in brilliants," which have been mounted there, to gladden the hearts of *chargés d'affaires*, *attachés* and vice consuls. The great Mehemet Ali, like all great men who, when they commit little actions, always do so on a great scale, may be said to be the first who ever introduced the bright delusions of M. Bourguignon to the unconscious acquaintance of the children of that prophet "who suffered no deceivers to live."

The wily old Mussulman, who knew the world too well not to be conscious of the value of an appearance of profusion on certain occasions, had announced that every pasha who came to the seat of government, to swear allegiance to his power, would return to his

province laden with presents of jewels for his wives. It may readily be imagined that, under such conditions, the duty became a pleasure, and that there needed no second bidding. Meanwhile Mehemet, with characteristic caution, had dispatched an order to his envoy, then sojourning in Paris, to send him forthwith as many of the diabolical deceptions of the lying Franks, in the way of mock diamonds, as he could collect. Bourguignon undertook to furnish the order, which was executed in due course, and duly appreciated, no doubt causing many a *Mashallah!* of delight to fall from the lips of the harem beauties of Egypt, and many an *Allah Hu!* of loyalty from those of their husbands, at sight of so much generosity.

A visit to Bourguignon's shop will inspire the mind with wonder to behold the perfection with which art can be made to imitate the most exquisite perfections of nature. The luster of the diamond, the richness, the double reflection of the ruby, even the caprice and deviation in the form and color of the pearl, escape not the cunning eye of the artist. Some of the *parures* are valued as high as five or six thousand francs. The workmanship, however, is as tasteful and costly as any produced by the first jewelers in the world. The setting is always real gold, and the fashion of the newest kind. A tiara from the shop of Bourguignon, of the price of six hundred francs, will rival in effect and delicacy of finish its neighbor which may have cost twenty times as much.

Dr. Schliemann's Archæological Discoveries.



WE MAY communicate, says the *Academy*, a few more details in regard to Dr. Schliemann's important discoveries at Tiryns. The walls of the prehistoric palace he has disinterred there are formed of limestone and clay; the latter has been turned into brick by the action of fire, while the stone has been burned into lime. In some places the surface of the walls had been coated with stucco, on which traces of painting can still be observed. The colors used in these paintings are black, red, blue, yellow and white; and Prof. Virchow has pointed out that the blue is composed of pulverized glass mixed with copper, but without cobalt. One of the paintings represents the same pattern as that found on the roof of the *thalamos* attached to the Treasury of Minyas at Orchomenos. Another depicts a man riding on an ox whose tail he holds. The artist has made three attempts to draw the tail and has forgotten to obliterate the two unsuccessful ones. The paintings have been carefully removed and sent to Athens. Among the ruins of the palace twenty-seven bases of limestone columns have been discovered, but no drums, besides a sandstone capital in the old Doric style. The chambers of the building were full of objects of all kinds, including pottery, obsidian knives, rude hammers of diorite and grapestones. No iron has been met with and but little metal of any sort, though lead is relatively plentiful. All traces of writing are equally absent. The pottery resembles that of Mykenæ, but the presence of obsidian and the scarcity of metal imply that Tiryns was the older city of the two. As has already been observed in the *Academy*, the scale and arrangement of the newly-found palace, with the two temples within it, are almost identical with those of the palace and two temples discovered in the second prehistoric city of Hissarlik.

Early last month the jewelry store of O. W. Greene, at Greenville, Mich., was entered by burglars and robbed of between \$5,000 and \$6,000 worth of goods. No clue to the robbers was found. Mr. Greene has been peculiarly unfortunate recently, having had his dwelling house burned not long since.

Trade Gossip.

Lemon & Emerson succeed F. Lemon, Aledo, Ills.
 C. C. Sidler succeeds J. A. Sidler, Milwaukee, Wis.
 J. G. Batte succeeds Henry Austin, Belton, Texas.
 U. C. Pipes has moved from Sparta to Arcadia, La.
 Robert G. Bruner succeeds G. J. Allen, Clinton, Iowa.
 J. W. Burke has moved from Lima to Prospect, Ohio.
 Hyatt & Case succeed C. M. Hyatt, Connellsville, Pa.
 C. J. Belles has moved from Fargo to Wheatland, Dak.
 Fred. Reiber has moved from Mayville to Buxton, Dak.
 J. B. King has moved from Athens to Hawkinsville, Ga.
 Frank Herbert succeeds H. K. Herbert, Garnet, Kansas.
 C. A. Seeley has moved from Homer to Litchfield, Mich.
 F. C. Robinson has moved from Blairsville to Apollo, Pa.
 Hedley & Bro. have moved from Baird to Vernon, Texas.
 Justen & Barnard succeed O. H. Justen, Northfield, Minn.
 G. L. McCoy has moved from Lima, Ohio, to Ponona, Cal.
 Henry L. Lang succeeds J. D. Robertson, Asheville, N. C.
 G. W. Bowden has moved from Martin to Tullahoma, Tenn.
 George L. Hepp has succeeded Wilson H. Appel, Lititz, Pa.
 Frank Leffler succeeds the firm of Goff & Leffler, Iowa, Kan.
 Overstreet & Swiney succeed F. Overstreet, Farmer City, Ills.
 T. W. Warren has moved from Bozeman to Helena, Montana.
 W. H. Farrior & Bro. succeed W. H. Farrior, Charlotte, N. C.
 H. G. Bradshaw has moved from Martinsville to Marshall, Ills.
 E. Baldwin & Co. succeed F. N. McElvain, Wood River, Neb.
 S. W. Service has moved from Fort Davis to Fort Grant, Texas.
 J. C. Harris has moved from Marion, Va., to Johnson City, Tenn.
 Edward K. Dick succeeds the firm of Dick & Dick, Greensburgh, Pa.
 Theo. Rust has purchased the business of W. P. Hobart, Dixon, Ills.
 The firm of Anderson & Hauser succeed A. Hauser, Milwaukee, Wis.
 E. F. King & Co. have moved from Buffalo Gap to Deadwood, Dak.
 Charles W. Rudd has moved from London, Canada, to Chelsea, Mich.
 Thos. Gaskell has moved from New Richmond, Wis., to St. Paul, Minn.
 Fred. C. Boerner succeeds Mrs. F. A. Boerner, Waxahachie, Texas.
 The business of D. H. Moore & Co., Fairmont, Neb., is advertised for sale.
 Gustave Otis, of the firm of Wallgren & Otis, Des Moines, Iowa, is dead.
 The firm of Branham & Davis succeed A. K. Branham, Greenfield, Ind.
 C. A. Seely has purchased the business of F. P. Bishop, Litchfield, Mich.
 K. H. Robinson has purchased the business of J. J. Dean, Bellville, Ohio.
 M. W. Foote has moved from North Adams, Mich., to Colorado Springs, Col.
 J. H. & W. W. Williams succeed the firm of Williams & Stevens, Macon, Ga.
 Edward J. Harpstrite has purchased the business of Herman Post, Decatur, Ills.

Robert Harris has purchased the business of John Trezise, Central City, Col.

Bernard Bernstein succeeds the firm of Klapper & Bernstein, Louisville, Ky.

James W. Vaughn has bought the business of M. L. Stutz, Yates Center, Kansas.

Charles Rosenberg succeeds the firm of E. Rosenberg & Co., East Saginaw, Mich.

Daggett & Clap have moved their factory from Attleboro Falls to Attleboro, Mass.

Mrs. E. O. Kirstine succeeds the firm of Kirstine & Carpon, Escanaba, Mich.

M. C. Einwalter has purchased the business of Lee & Mattson, Estherville, Iowa.

William Watkinson has purchased the business of Charles Hamilton, Billings, Mo.

A. W. Woodcock & Son, Salisbury, Md., have dissolved, the son retiring from the business.

The business of O. L. Elterman, Millbank, Dak., is closed in consequence of his death.

E. H. Jones has purchased the business of Alexander Jones, deceased, Coffeerville, Miss.

The business of A. L. Beatty, deceased, will be continued at Independence, Miss., by his widow.

The firm of Perry & Mead, Chicago, Ills., has been dissolved, M. A. Mead & Co. succeeding the old firm.

The firm of McIntyre & Davidson, Portage La Prairie, Manitoba, has dissolved. A. H. McIntyre will continue the business.

It is reported that Bennett & Williams, Urbana, O., are selling their stock at auction with a view of dissolving partnership.

Elbe & Klinkowstein have in stock a fine line of diamond mounted goods, consisting of lace pins, rings, ear rings, etc.

A. T. Wall & Co., have just begun business in Providence, manufacturing gold and silver plate, fancy wires being a specialty.

Wm. S. Pipes succeeds the firm of W. S. Pipes & Bro., Waynesboro, Pa., and Geo. W. Pipes succeeds the firm in Cameron, W. Va.

Mr. F. H. Mulford, of Mulford & Bonnet, returned from Europe on the *Celtic* October 18, having purchased a variety of rare and beautiful stones.

The firm of Wm. Morris & Co., Baltimore and Philadelphia, has been dissolved, Wm. Morris continuing in Philadelphia and M. Kohner in Baltimore.

Kirby, Mowry & Co., a new firm just started in Providence, will manufacture a line of solid gold, white stone and diamond jewelry exclusively for the jobbing trade.

Messrs. Sartorius & Co., 12 Barclay street, have received a large importation of opaque and transparent enamels adapted to the jewelry trade, which will resist acids.

Mr. E. J. White, a jeweler, of Bainbridge, N. Y., formerly of New Berlin, while crossing the railroad track at Bainbridge was struck by a train and instantly killed on Monday, Oct. 12.

Mr. R. B. Macdonald is making a numerous line of novelties in sawed work. His rolled plate chains, stamped "R. B. M.," are selling well. He is represented on the road by J. W. Lucas.

The opal, after long disuse, has again come into favor, and these beautiful gems with their ever-changing colors are now much sought for and worn. When fine, no other stone can equal the opal in effectiveness.

Mr. B. H. Knapp, of the firm of Smith & Knapp, arrived from Europe on the steamer *Servia*, October 11th. During his trip abroad he selected a very elegant stock of exceptionally fine cut stones and matched pairs.

The annual dinner of the New York Jewelers' Association will be held at Delmonico's November 18th.

Mr. Louis Neresheimer, of E. Aug. Neresheimer & Co., sailed for Europe in the steamer *Saale* October 27th.

Albert Lorsch & Co. have purchased the entire stock of imitation and semi-imitation stones of Victor Bishop & Co.

Victor Bishop & Co. will hereafter devote themselves to the importation of diamonds and other precious stones.

The wholesale and manufacturing jewelers of this city recognized Bartholdi Day by closing their places of business at 12 o'clock.

Mr. John W. Steele has formed a connection with C. G. Alford & Co., and will represent that firm in the South where he is well known.

The firm of Macdonald & Clausin, jobbers, of Minneapolis, having been dissolved, the business will be continued by H. C. Clausin.

Mr. William A. Lee, with H. C. Hardy & Co., was married to Miss Mary A. Dodd, daughter of David C. Dodd, Jr., at the family residence in Newark, Oct. 20.

Max Freund & Co. are continually adding to their diamond department, which they have made a new feature for this season. Their stock is complete and desirable.

Mr. Frank Ogilvie, for the past eighteen years with Brainerd, Steele & Co. and John W. Steele, has made an engagement with A. Bernhard & Co., No. 2 Maiden Lane.

Mr. Charles E. Juillerat, of 18 John street, has made a large importation of musical boxes of all sizes and styles, and of the best quality to be found in Geneva and Ste. Croix.

The New York Standard Watch Co. will, in the course of a few weeks, place on the market a new watch, in the construction of which are embodied some entirely new and novel features.

Messrs. Joseph Fahys & Co. have discontinued the making of their flexible, enameled watch cases, 18 size, open face, key and stem wind, and their entire stock has been purchased by S. F. Myers & Co.

Charles Leo Abry, agent in this country for the Vacheron & Constantin watch, has published a handsome little pamphlet descriptive of this watch and its makers. It will be sent to the trade on application.

Mr. F. Kroeber has issued an elegant catalogue, lavishly illustrated, for the seasons of '86 and '87. It contains nearly 200 pages and is fully descriptive of the large assortment of clocks which he carries in stock.

Mr. Daniel B. Waite, of Providence, died at his residence in that city October 1, at the age of 61 years. He was the senior member of the firm of Waite, Mathewson & Co., and was highly respected by all who knew him.

Mr. Chester Billings, of Randel, Baremore & Billings, returned from Europe the latter part of last month. This house is receiving large importations in their line, and have most admirable stock of goods for the fall trade.

Mr. Charles W. Schumann has distributed about \$7,500 among different charities, which has been realized from exhibiting that famous Russian picture which has occupied so prominent a place in his store for a year or more.

Howard & Son, of Providence, announce a new collar and sleeve button which they have named the "Sensation." It is made of two pieces only of rolled plate without solder. It will be made in nine varieties and may be ordered now.

The estate of William A. Churchill have sold their interest in the firm of Churchill, Lewis & Wessel, to Frederick Wessel and Charles J. Leward. The business will be continued as heretofore, under the firm name of Lewis, Wessel & Leward.

Initial rings are always in order and acceptable gifts for any occasion. Mr. H. F. Hahn, of Chicago, says: "So long as people have names they will have initial rings." The styles in which they are made are innumerable and mostly desirable.

George A. French, representing Wm. S. Hedges & Co., returned from Europe last month. This well known house has a large stock of unset diamonds as well as a full line of diamond jewelry in newest styles, suitable for fall and winter trade.

A second fair for the benefit of the Swiss Home in Second avenue, of the Swiss Benevolent Society at Irving Hall, November 17-20. The Home is doing most excellent work among the Swiss population and is deserving of the support of the benevolently inclined.

Mr. S. K. Webster, of the American Watch Tool Company, of Waltham, celebrated his twenty-fifth wedding anniversary at his home in that place during the past month. Numerous friends gave substantial proof of the estimation in which he is held by them.

Among the passengers by the *Aurania* which recently arrived, was Mr. W. H. Vogel, buyer for Alfred H. Smith & Co. He was exceedingly successful in securing a large and desirable assortment of diamonds and other precious stones, which are offered to the trade for the fall and holiday demand.

Recently Mr. William K. Atwood, of the firm of Atwood & Colwell, of Providence, was driving with his daughter, when the horse took fright and ran away. The carriage was upset, and the occupants received severe and painful injuries, but fortunately none of them were of a dangerous character.

We have received from F. J. Britten, London, a copy of the sixth edition of his popular "Watch and Clockmakers' Hand Book, Dictionary and Guide." The work is a familiar text book and needs no commendation at our hands. It is copiously illustrated and contains elaborate tables also for practical use.

The American Watch Tool Company, of Waltham, has given notice that it will give a gratuity of ten days' pay to any workman who remains ten years continuously in its service, and twenty days' pay on the completion of fifteen years. Mr. F. W. Derbyshire has already secured the first-named gratuity.

In the December number of THE CIRCULAR we shall print a carefully prepared article by "Excelsior" on "Isochronal Hair Springs," illustrated by several engravings drawn by himself. "Excelsior" is so well known as a technical writer on horology, that the article named will no doubt be eagerly sought for.

Owing to a misunderstanding, the letter press accompanying a new advertisement of the Chalmers-Spence Co., manufacturers of asbestos soldering blocks, was not changed in our October number, thus making the price of a special block for soldering stone-set rings 50 cents each, when it should have been 75 cents.

Mr. B. J. Angell, of the firm of Horton, Angell & Co., of Attleboro, was thrown from his buggy on the 13th ult., receiving a fracture of the skull, from which he soon after died. He was a popular and highly respected gentleman and a successful manufacturer. He was 55 years of age, and leaves a wife and one daughter.

Mr. Geo. A. Reed is installed in his new quarters at 45 Lispenard street, where he has on display a fine line of French clocks, bronzes and fancy goods just brought over from Europe, which he is selling at a very low figure. Mr. Reed is well known to the trade and invites his friends and the trade in general to call and see his stock.

Mr. Herman Hoffman, of Leavenworth, Kansas, died suddenly in that city October 15. He had attended to business as usual during the day, but on returning home in the evening complained of not feeling well, and while at supper suddenly fell from his seat and expired. He had been identified with the jewelry business in that city for about twenty years, and was highly esteemed as an enterprising business man and a public-spirited citizen.

A telegraph dispatch from Kansas City, dated October 26th, says that a trunk containing \$12,000 worth of jewelry samples belonging to the agent of a Cincinnati jewelry firm was checked for this city from Wakona, Mo., on the Wabash Railroad, and due here Saturday night. It has not arrived, and the authorities have been unable to find it.

Messrs. G. & F. Hartje present to the trade in this issue some designs of their latest patent in rings, set with diamonds and fancy stones. They carry a rich and attractive stock, consisting of lace pins, ear rings, rings, fancy bracelets, studs, brooches, etc., and are constantly making to order fancy pieces for presentation for the fine retail trade.

The silver workers in Tiffany & Co.'s factory recently struck for advanced wages, and named some grievances they desired redressed. A committee of the union had an interview with members of the firm, when it was agreed that wages should be advanced \$2 a week, and piece work be abolished. Upon this understanding the men returned to work.

Mr. H. F. Carpenter calls the attention of the trade to his chemically pure gold, an article of absolute purity, manufactured and sold only by him. By its use the manufacturer not only obtains a desirable color, but a uniformity of shade impossible to be had by the use of ordinary gold, as no two lots of the latter can be bought of precisely the same fineness.

Salisbury, Md., suffered from a great conflagration about the middle of October, the total losses by which are estimated at \$1,000,000. About twenty acres in the business portion of the town were burned over. Mr. Amos W. Woodcock lost both his store and residence, his loss being about \$5,000. His stock was mostly saved by the efforts of himself and neighbors.

The Gorham Manufacturing Company exhibit in their salesrooms, corner of 19th street and Broadway, an unusually large and elegant assortment of silverware in all varieties and forms. Many of the pieces are elegant examples of artistic workmanship, rich in decoration and novel in form. Their stock is an excellent illustration of the wonderful progress made of late in this line of art work.

Miller Brothers, 7 Maiden Lane, are mounting some of the fine diamonds brought home from Europe by Mr. Isaac Miller, in a new setting which is attracting attention. This setting is of platinum and leaves the back of the stone uncovered. This setting is worth investigating, for it is likely to prove a popular arrangement in the setting of solitaire ear rings and other gems that hang pendant.

William Holmgrau, bookkeeper and cashier for Shourds, Storey & Kasper, Chicago jewelers, is missing. It is reported to-day that his accounts are \$10,000 short. Holmgrau had been with the firm eight years. He has not been seen for several days. It is believed that he is in Canada. The dual position occupied by Holmgrau enabled him to carry on his speculations with ease, and for a long period.

Mr. Tell A. Beguelin, 71 Nassau street, has just returned home after a lengthened tour in Europe. Mr. B. has made a large importation of watchmakers' and jewelers' tools and materials, and also of watches. Among the latter is an elegant minute repeater with perpetual calendar, artistic in every sense and worthy the notice of the trade. A full line of Swiss watches is also among his importations.

Wood & Hughes, No. 16 John street, who are all the time making attractive things in sterling silver, are showing this autumn a great variety of articles not only for the table but for toilet purposes. Their line in "sugars and creams" is an extended one, and includes many very desirable designs. Their assortment in way of silver-backed brushes and decorative handles for whisk brooms is a fine one. Here, too, are to be found all sorts of odd and convenient pieces, such as berry and after-dinner coffee spoons, olive and pickle dishes and the like. In a word, theirs is a good stock from which to select taking novelties in many lines, where fine workmanship and artistic decoration is desired.

Messrs. Jacot & Son, importers of musical boxes, 37 Maiden Lane, have issued an illustrated catalogue of their importations. Among the novelties we observe ladies' musical work boxes, musical decanters, the music box being entirely concealed, also teapot stand containing concealed music box, beautifully painted and enameled. These and many other novelties are especially adapted for holiday presents.

M. J. Paillard & Co. are preparing a handsome catalogue for the autumn trade, which will be sent to any address on written application. This will appear in book form, and will contain illustrations of their interchangeable cylinder music boxes and other improved musical boxes made by them. This catalogue is designed to assist out of town dealers in making a judicious and attractive selection of boxes for their trade.

Mr. F. M. Finch, of St. Paul, writes that the partnership of Myers & Finch is dissolved, and that he is to open a new store. He adds that THE CIRCULAR has regularly appeared on his desk for the past fourteen years, and wants it continued to his new address. Mr. H. J. Woodside, of Portage la Prairie, Manitoba, writes: "I couldn't do without the old reliable CIRCULAR, which I consider to be improving all the time."

The creditors of Julius Urtwitz, the absconding jeweler of Toronto, recently met and appointed P. W. Ellis and Max Saunders to assist the trustee, Reuben Gunther, in straightening out the tangled affairs of the estate. Mrs. Urtwitz offered the creditors twenty-five cents on the dollar in settlement of their accounts, but the offer was indignantly rejected. The affair is regarded as one that should be thoroughly investigated.

Mr. James Allan, of Charleston, writes as follows: "In looking over the names of contributors to the Charleston sufferers I do not see the name of Messrs. Dominic & Haff, and I would like to see their name enrolled among the contributors. I think about the 3d day after the shock came a telegram from them: 'Draw on us for the benefit of your Relief Committee.' The amount contributed was a handsome one and much appreciated."

Early last month seventy men employed by T. G. Hawkes, manufacturer of cut-glass ware at Corning, N. Y., went on strike. A committee of three, of which only one was an employee in the factory, waited on the proprietor, and demanded that he should discharge six apprentices that were working in the factory. Mr. Hawkes refused to comply with this demand, and the strike followed. Other men were set at work at once, and the business of the factory suffered no interruption.

A subscriber in Helena, Montana, writes: "Out of seven papers that I receive, THE CIRCULAR is the leader, and I would not be without it for twice the cost, as it keeps me posted on matters belonging to the trade. I have not seen an item from this part of the country for some time. Most everybody is busy in the workshops manufacturing, cleaning and repairing, and haven't time to write news. This country is taking on a brighter face now than it had two months ago. After the election is over, trade will loom up to be very good for two months or more."

We warned the trade last month against one Harrison Lockwood, who was sending out orders from Castorland, N. Y., promising to pay for goods on receipt. The Board of Trade looked up his antecedents, and found them rather unsavory. Nevertheless, it is reported that he succeeded in obtaining about \$150 worth of watches from Jacob Morch, of Brooklyn, E. D. He wrote to Mr. Morch, stating that he was a practical watchmaker, a young man, just married and anxious to go into business for himself; if Mr. Morch would send him the goods ordered, he would surely pay him promptly. The goods were sent; but when subsequent inquiries were made for the young man, he had disappeared without leaving his address.

In January last two thieves, known as William M. Gregory and John Straus, while looking at diamonds in the store of C. G. Rochat, in Jersey City, succeeded in substituting some paste diamonds for genuine and escaped with their booty. Next day they were arrested in Newark for a similar robbery perpetrated on a jeweler of that city, Straus being sent to State Prison and Gregory to the Penitentiary. Recently Gregory's time expired, and he was promptly arrested again and held for trial for the Rochat robbery.

A colored porter named William Johnson, in the employ of James H. Hart, a jeweler in Brooklyn, was recently arrested on the charge of robbing his employer. The police had found him pawning valuable goods and reported the facts to Mr. Hart, who had been missing a variety of articles, but had not suspected his porter. The accused confessed to having taken over \$150 worth of goods, and was held to answer. When arraigned before the court Johnson was sentenced to twenty-five days' imprisonment.

The link bracelet, with ball-guard attachment, made by Day & Clark, is meeting with great success. They are made in a variety of attractive styles, with mountings for one, three and five stones, and without settings. The picked-nugget finish adds a brilliant appearance to the goods. In addition to their popular bracelet, they also make a fine line of chased and nugget-link bracelets, diamond covers, lace pins, ear rings and ear studs, all sizes of Roman and polished bead necklaces. These goods are made strictly in 14 karat.

The smelting works of Edward Balbach & Sons, of Newark, have been persistently robbed of precious metals by workmen in their employ. In spite of the utmost vigilance the metal has continued to disappear. Recently several men were arrested on suspicion, and have been held for trial. Jacob Hornlein and a man named Eberhardt have also been arrested charged with receiving the stolen property. Detectives have been employed to sift the matter, and it is hoped that they will be able to find the guilty workmen.

Chas. D. Pratt Company, a new firm, lately started as importers and jobbers of fancy goods, have on display an entirely new and extensive line of artistic bronzes, jewel and dressing cases, opera glasses, plaques and bas-reliefs in terra-cotta and bronze, marble and mechanical clocks in original and quaint designs, and rich pieces of Vienna, Parisian and Berlin novelties embracing the latest and choicest productions, personally selected and specially imported, and a full assortment of the unique designs which the manufacturers of said capitals have produced for the holiday trade.

Apropos of the live-bug craze for decorations for ladies' bonnets, a dealer in Lowell obtained possession of a California horned toad, which he decorated, placed on a bonnet, and displayed in his shop window, to the admiration and amusement of the multitude. The toad was decorated, as to his horns and capacious mouth, with gold leaf, while a gold chain encircles his body; this is attached to a gold pin fastened to the bonnet, which limits the peregrinations of his toadship to the rim of her bonnet. It makes an attractive advertisement, and is relished as a good burlesque on the rage for live bugs and other insects for bonnet decorations.

The middle of last month the jewelry firm of J. W. Andrews & Co., of St. Louis, packed a large trunk with samples of watches, bracelets and other jewelry, to the value of about \$5,000, which they sent to the railroad station, intending to ship the trunk to their traveling man in Kansas. When a clerk of the firm went to the station to attend to the shipment, the trunk was missing. It was learned that a man had called for it soon after it was left at the station, saying that he would take it along with him on the night train. He presented a ticket for Memphis, and had the trunk checked to that point. It was supposed that the trunk had been stolen by an adroit thief, but it was subsequently found at Memphis in the custody of a gentleman who was greatly annoyed that the jewelry trunk had been substituted for his own through the blunder of a baggage man who exchanged the checks.

The Leroy W. Fairchild Company makes a very attractive display of gold pens and special novelties at the American Institute Fair, now open in its large building on Third avenue. Mr. D. De Sola Mendes has a diamond cutting and polishing machine on exhibition, and there are a few cases of jewelry also on view. It has come to be generally understood, however, that the fairs of the American Institute are designed more especially for machinery and inventors than for art goods or articles of general commerce, so that in these lines the exhibition is not particularly attractive.

Mr. C. H. Behre, of Charleston, recently died from an attack of paralysis brought on by the misfortune that overtook him resulting from the earthquake in that city. The disaster destroyed two buildings owned by him, broke up his business, and these misfortunes coming upon him in his old age and in his enfeebled condition, brought on the attack from which he died. He was a native of Germany, but came to this country and located in Charleston upwards of fifty years ago. He had been fairly prospered, and enjoyed the confidence of the community in which he lived.

The Repository, published at Canton, Ohio, on October 4 printed an elaborate illustration of the design for the new factories now in process of erection at that place, of the Dueber Watch Case Company and the Hampden Watch Company. It represents four immense buildings and numerous smaller ones, many of which are designed for residences of workmen. The paper states that since the Dueber people decided to locate there, several other manufacturing industries have determined to build factories in that town. The two factories named will give employment to about 4,000 persons, which will make a liberal increase to the population of Canton.

On October 12th Mr. Jacob Strauss, a member of the Board of Trade, notified Secretary Condit that a person had obtained from him in this city a diamond stud, and he was informed that he had gone to Denver, Colorado. He wished the Secretary to endeavor to get the pay for the stud or the return of the stud itself. Mr. Condit communicated to the representative of the Board in Denver, and the person having the stud was soon found. As he was not in position to pay for it, he was induced to return it, so that in a week from the time of reporting his loss to Mr. Condit, Mr. Strauss had his goods back. But for the interference of the Board of Trade, he would probably have been minus a diamond stud.

Messrs. S. F. Myers have in course of publication three catalogues, one of which is a complete and comprehensive book of 512 pages, 16 mo. size, printed on heavy paper and bound in substantial cloth covers, containing a description of every article of staple and novel goods from their numerous departments. They will also issue a tool and material list; also a clock catalogue showing various styles, particularly those of the Terry Clock Company's improved clocks, embracing their patent ebonized wood and luminous dial, for which company they are sole agents. They will send these publications to their regular customers and others on application when the usual business card is enclosed. Rates of discount enclosed in separate sealed envelope.

A most ingenious clock is exhibited by Mr. W. R. Smallwood, at his store in Gowanda, N. Y. It is entirely of his own design and construction, occupying a portion of his time for a year and a half. It has sixteen dials, which give the standard local time in both the twelve and twenty-four hour systems, the day of the month and of the week, and the true sun time at Rio Janeiro, Greenwich, Copenhagen, St. Petersburg, Mt. Ararat, Calcutta, Peking, Melbourne, Sandwich Islands, San Francisco, Denver and St. Louis, and the several dials can be set simultaneously by turning a single wheel. In size it is 34 inches long, 32 inches high, and 13½ inches deep. The weight of the movement alone is 165 pounds. The entire works were made by Mr. Smallwood, as were also the tools with which to make them. Mr. Smallwood has had the clock photographed in various sizes, and offers them at \$1 for those of 16x18, cabinet size for 35c., and stereoscopic views at 30c. a pair.

The Legislature of Maryland having voted to present to Commodore W. S. Schley, a native of that State, a testimonial in recognition of the service rendered by him in the rescue of Lieutenant Greely and his band of Arctic explorers, a handsome gold watch and chain has been selected as an appropriate gift. The watch was made by Girard Perregaux, of Chaux de Fonds, Switzerland, the case being of American manufacture. A heavy cable chain is attached to the watch, having an anchor and compass as charms, the bar representing a belaying pin. Inside of the case is the following inscription: "The State of Maryland to Commodore Winfield Scott Schley, U. S. N., for his heroism and memorable service in rescuing Lieutenant A. W. Greely and six of his comrades from death at Cape Sabine, in the Arctic regions, on June 22, 1884." On the front of the watch a monogram is formed of the initials "W. S. S.," all being handsomely engraved.

Philadelphia had a little trade sensation last month, caused by the disappearance of Frank C. Jardin, a young man who had been engaged in business but a short time. He was formerly in the employ of the John Carrow Silver Plating Company, Mr. Carrow being his uncle. Early in the spring he went into business for himself, succeeding in obtaining a limited amount of credit. With purchased goods and goods on consignment he managed to make quite a show of stock, and was believed to be doing a fairly good business. About the middle of last month, however, young Jardin was among the missing, and then his creditors ascertained that his stock and fixtures had been sold to Simon Hirschberg for \$800. A check which Jardin had given his landlord for rent for \$50 was found to be valueless, so the landlord attached the fixtures. Hamilton & Diesinger, who claim to have sent Jardin goods on consignment, have attached the stock in the hands of Mr. Hirschberg, claiming that they had never parted with the title to the goods. The liabilities are stated to be about \$10,000. As Jardin married into a good family it is thought his wife's relatives may come forward and arrange his affairs satisfactorily to the creditors.

A writer in *The World* in his Sunday chat has the following: "I was chatting the other evening with Mr. Kunz, mineralogist, who, by the way, prepares the annual gem report for the U. S. Geological Survey, when the conversation turned upon some of the more recent favorites in the way of *pièrres de fantaisie*, with which fashion delights in decorating itself. Said he: 'One of the handsomest stones to which my attention has of late been directed is the "Golden Beryl," so named on account of its brilliant golden color. Everyone is familiar with beryls of one kind or another, the emerald and aquamarine for example. There are common and precious beryls. The latter are never found in sufficient quantity to lessen their gem value, and I have never seen one larger than six or eight karats. The golden beryls, of which I was speaking, are of the latter class and are a native product, coming from a mine recently discovered in the Berkshire Hills of Connecticut. In this, as in most instances, they are a bi-product of mica deposits. These are by far the finest specimens I have seen. Beryls of even a yellowish color," said Mr. Kunz, "are rare; much more so are those of such luster, clearness and rich golden color as distinguish these from Connecticut. I doubt very much whether they will be unearthed in any considerable quantity, and I assume that this deposit will shortly be exhausted. In composition and crystallization they are identical with the emerald and aquamarine, save in the matter of coloring. In hardness they rank as eight, with the sapphire at nine and the diamond at ten. They have a high degree of brilliancy. As a gem, they are new in the market and are decidedly handsomer than the topaz. If fashion sets its fancy upon them, I can see no reason why they should not become at once very popular. As for diamonds, the finer stones are as much prized as ever. Rubies were never in greater demand nor commanded better prices.

Mr. James H. Hart, the jeweler, of Brooklyn, has always been a believer in early closing. He has never thought that the employees of store-keepers should have to work continuously for thirteen hours on Saturdays, unless the public desire that they should. In order to get an expression of the popular will about early closing on the last day of the week, Mr. Hart resolved to take a vote upon the subject. He prepared ballots for and against 6 o'clock closing on Saturdays, and the polls were opened at his store and were to continue open till the 30th of October. If the vote is in favor of closing at 6 P. M. on Saturdays, Mr. Hart will close even if no other jeweler does.

The following dealers were in town during the past month: J. Ollendorf, Pittsburgh, Pa.; M. Timpane, Troy, N. Y.; J. Nawmil, Sr., Syracuse, N. Y.; M. Pomeroy, of D. Greenleaf & Co., Jacksonville, Fla.; M. Jacobs, of Jacobs Bros., Washington, D. C.; John Spencer, Norwalk, Conn.; Col. A. Andrews, San Francisco, Cal.; W. W. Wattles, Pittsburgh, Pa.; A. S. Ferris, South Norwalk, Conn.; L. Bowermann, San Francisco, Cal.; J. D. Curtis, Bloomsburg, N. J.; F. D. Kernochan, Middletown, N. J.; W. M. Smith, Florence, Mass.; R. S. Gardner, Birmingham, Conn.; Mr. Hoyt, of Clark & Hoyt, Stamford, Conn.; F. P. Smith, Lawrence, Mass.; Rubin & Paris, Ithaca, N. Y.; Julius Socha, Galveston, Texas; E. Vanderwerker, Stamford, Conn.; D. Greenleaf, Jacksonville, Fla.; M. N. Levy, Cortland, N. Y.; W. H. Kennard, Boston, Mass.; H. L. Rhoades, Lancaster, Pa.; E. T. Child, Hamilton, Bermuda; J. J. Freeman, Toledo, Ohio; Charles Osgood, Lewiston, Me.; P. D. Walter, Lockport, N. Y.; William Beard, Riverhead, L. I.; Frank Beard, Babylon, L. I.; J. Basinski, Miles City, Montana; Mr. McAllister, of McAllister & Humbert, Rochester, N. Y.; J. S. Hall, Morristown, N. J.; W. A. Adams, Factory Point, Vt.; Werner Bros., Bangor, Pa.; G. E. Marshall, Middleberg, Vt.; A. Townsend, Matteawan, N. J.; L. Roberts, Bristol, N. Y.; M. Goodman, Rochester, N. Y.; E. M. Munger, New Haven, Conn.; G. B. Gardner, Canaan, Conn.; J. S. Hawksworth, Keyport, N. J.; F. B. Catlier, Norfolk, Conn.; Mr. LaFrance, of LaFrance & Wise, Elmira, N. Y.; Mr. Hibbard, of J. B. Storer & Co., Akron, O.; J. E. Rude, Weedsport, N. Y.; A. Preusser, Grand Rapids, Mich.; G. H. Wood, Lowell, Mass.; W. N. Frost, Elmira, N. Y.; F. L. Wilson, Danbury, Conn.; F. J. Woodruff, Keyport, N. J.; C. L. Haskins, Saratoga Springs, N. Y.; P. E. Robinson, Patchogue, L. I.; C. W. Vail, Bay Shore, L. I.; E. Schall, Hartford, Conn.; S. P. Nichols, Palmyra, N. Y.; Mr. Grant, of Brown & Grant, East Saginaw, Mich.; Mr. Fulmer, of Fox & Fulmer, Easton, Pa.; W. L. Young, Geneva, N. Y.; H. Dutcher, Port Jervis, N. Y.; D. P. Smyth, Wilmington, Del.; T. G. Calvert, Lexington, Ky.; M. S. Dooler, New Orleans, La.; A. L. Hosmer, Lockport, N. Y.; Mr. Voorhees, of Voorhees & Van Winkle, New Brunswick, N. J.; S. P. Hamilton, Savannah, Ga.; J. Ganse, Minneapolis, Minn.; M. D. Fletcher, Springfield, Mass.; E. A. Brown, St. Paul, Minn.; Mr. Cobb, of Cobb & Waldorff, Hornellsville, N. Y.; A. J. Pollock, Antrim, Pa.; J. Wetherell & Sons, Parkersburgh, W. Va.; Oswald & Cromwell, Sing Sing, N. Y.; Hicks Bros., Long Branch, N. J.; S. A. Simmons, Wappinger's Falls, N. Y.; E. T. James, Sing Sing, N. Y.; T. C. Tanke, Buffalo, N. Y.; M. Dubois, Ellenville, N. Y.; J. Wendell's Sons, Oswego, N. Y.; Mr. Camp, of Stanley & Camp, Milwaukee, Wis.; M. Judd, Toledo, O.; C. A. Lyman, Milford, Conn.; W. C. Wright, Tarrytown, N. Y.; Mr. Steinmetz, of Steinmetz & Rumly, Helena, Montana; M. T. Vogler, Winston, N. C.; T. S. Steele, Hartford, Conn.; M. T. Fischer, Chattanooga, Tenn.; W. H. Haslett, Terre Haute, Ind.; E. D. Vosbury & Co., Binghamton, N. Y.; G. W. Fairchild, Bridgeport, Conn.; Mr. Thomas, of Carrington, Thomas & Co., Charleston, S. C.; F. A. Robbins, Pittsfield, Mass.; C. B. Eustis, of Eustis Bros., Minneapolis, Minn.; J. Joslin, of Joslin & Park, Salt Lake City; E. B. McClelland, Syracuse, N. Y.; F. M. Finch, St. Paul, Minn.; J. W. Young, Petersburg, Va.; W. R. Arnold, Watertown, Dak.; Geo. H. Richards, Jr., Boston, Mass.



VOLUME XVII.

NEW YORK, DECEMBER, 1886.

No. 11.

THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW


Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silversmiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION:

To All Parts of the United States and Canada,
\$2.00 Per Annum; Postage paid.

To Great Britain, France, Switzerland, Germany, the West Indies, Mexico, the Republics of South America, and Australia, \$3.00 per annum. Postage paid.

 All communications should be addressed to SETH W. HALE, President, THE JEWELERS' CIRCULAR PUBLISHING CO., 189 Broadway, New York.

 Advertising rates made known on application. 

Associated Effort for Business Improvement.

WHEN ANY branch of business becomes thoroughly demoralized, whether from excessive competition or indulgence in a general variety of unbusinesslike practices, and it seems inevitable that all who are interested in it will lose money, it is customary for those who are prosecuting that line of business to get together and form an association for the protection of their interests and the reformation of abuses. There are, in consequence, trade associations in almost every line of industry, and the jewelry trade can boast of several that are doing good work in special directions. Such is the National Association of Manufacturers and Jobbers in Movements and Cases. Previous to the formation of this association, the trade in movements and cases was very much demoralized, so that there was little opportunity for any one to make a reasonable profit in either making or handling such goods. Not only were legitimate profits cut down to manufacturers and jobbers, but the abuses had permeated the retail trade, till no man could say what was the purchasing or selling price of these goods. Not only this, but in cases especially, the extraordinary competition between manufacturers had resulted in the cheapening of quality to such an extent that the reputation of their goods had suffered materially, and public confidence in them was rapidly on the wane. With the organization of the association referred to, this condition of things was speedily changed, and an improvement in the business was immediately secured. Almost the first work done was to establish

a schedule of prices for goods, and to regulate discounts; also to perfect the list of jobbers, eliminating therefrom those retailers who had been accorded jobbers' privileges, thus giving them an advantage over their competing neighbors in the retail trade. The effect of this has been to greatly improve the traffic in these goods, and we do not receive one-tenth the number of complaints regarding this branch of the jewelry trade that we formerly did. The association had many difficulties to encounter at first, but by meeting each question that arose in a broad-minded manner, and consulting the welfare of the majority, it has at last got into smooth water, where the sailing is unobstructed, and the results accomplished highly satisfactory to all concerned. These results could not have been attained but for the conciliatory and self-sacrificing spirit manifested by all members. Each one, of course, had his own peculiar ideas as to conducting his business, but all were so conscious that the existing competition was suicidal, that they were willing to give up their individuality, so far as was consistent, in order that the greatest good to the greatest number might be secured. There are other organizations within the trade that have done good work in promoting the general welfare, and still others might be formed to good advantage.

The jewelry trade is made up of almost innumerable specialties, and hence it is impossible for any one organization to cover all the points that ought to be covered. We have had considerable to say at times relative to certain abuses in the manufacture and sale of jewelry proper, including both fine and cheap goods. The competition in these is very great, and all the evils of which the movement and case men had to complain of exist in the jewelry branch, together with numerous others of which the movement and case makers know nothing. As a consequence, manufacturers and jobbers, and the retailers as well, are complaining that there is no profit in the business, and that everything is going to the dogs. While it is true that similar complaints have been made from time immemorial, it is highly probable that the situation has never been quite so bad as now for the reason that the number of persons engaged in the business has largely increased during the past few years, and the competition increased correspondingly. It has been suggested that there might be formed an association of jewelers, including manufacturers and jobbers, which could apply a remedy to many of the abuses that exist, and restore confidence to the trade in general. The question being asked why the Jewelers' Association of New York is not competent to deal with these subjects, the answer comes that the membership of that body is too diffuse to permit it being done successfully. The association includes watch, clock and case makers, dealers and importers of precious stones, manufacturers of fine and cheap gold goods, and the methods necessary to success in one of these branches is virtually a sealed book to all the others. The various branches of the jewelry trade are as distinct as though they were separate industries, and had no interests in common. If, therefore, there is to be organized effort for the betterment of the

business, each distinct branch must form its own association, and include in its membership only such persons as are identified with that particular branch of the trade. Thus, the makers of fine gold goods might organize, ascertain what causes are operating to their disadvantage, and then intelligently set about overcoming them. They might fix the quality of gold to be used in their products, and the minimum price at which such products should be sold: the price of metal of a certain quality could be made arbitrary, and the value of the work entering into any class of goods left optional with the manufacturers. There are, however, certain classes of standard goods, the manufacture of which is common to all; the prices at which these might be sold could be made arbitrary. Such an organization could do much to restore confidence in the integrity of sold goods, and to convince the public that fourteen karat goods are not habitually made out of ten karat gold.

There might also be an association of rolled plate goods, that should, in like manner, fix the quality of rolled plate, and the minimum prices at which the different qualities might be sold, thus insuring the trade and the public against being imposed upon by misrepresentation as to quality. The cost of production would, of course, have to be left to the decision of each manufacturer, but let the standard of quality be once established, and a price agreed upon below which the metal, as determined by weight, shall not be sold, and the matter of the cost of production is one that can be safely left to take care of itself.

There are many other special branches of the jewelry trade that might organize to advantage, and, in so doing, secure united action that would tend to greatly improve their condition. There are certain things in connection with every one of these individual industries that are common to every person connected with them; upon this common ground they might come together and establish a unity of action that would bring a general improvement to the business, in which the entire trade would share. What it would be impossible for the trade in the aggregate to do might be accomplished by the trade in sections, each separate branch having its own organization to look after its special features, but working in harmony with every other section to secure a result beneficial to all. In short, the jewelry trade might well steal a leaf from the experience of the Knights of Labor, and, by the organization of protective associations in each individual branch of the industry, work for the advancement of the whole. These are merely suggestions thrown out with the idea that some practical organizer may catch an idea from them and ultimately work some good out of them.

Can Credits be Insured?



WHY NOT? Why is it not feasible to form an insurance company that will insure the credit of a merchant or dealer to any reasonable extent, and thus give security to his creditors and save him much annoyance? There are several insurance companies in the country that have demonstrated that it is not only feasible to insure the integrity of individuals, but also that it is safe and profitable to do so. Now it would simplify business if when Jones, of Arizona, comes to New York to buy goods, he could step into any house in Maiden Lane and say: "I want to buy \$5,000 worth of goods, and although I am a stranger to you, I want credit for them; the Credit Guarantee Company around the corner will become my security, and will give you a policy contracting to pay this bill when due if I do not." He then might go on and select his goods, have the bill made out, and on its being approved by him, have it sent around to the guarantee company for the policy covering the amount. This is not a new suggestion by any means, for it has been discussed by others, both in private circles and in print.

While nothing practical has ever come of the discussions, that is no reason why something may not come of it eventually. The success of the half dozen or more fidelity companies has paved the way for something in the nature of a Credit Guarantee Company. Many of the railroad companies require fidelity bonds from every one of their employees who is charged with any pecuniary responsibility, and the fidelity companies make contracts to supply such bonds along a whole system of railroads. To protect themselves, they make careful inquiry into the antecedents of every person whose fidelity they insure, and take every precaution to protect themselves. As a consequence, they are seldom victimized, but when they are they leave no stone unturned to secure the punishment of the person who has betrayed their confidence. Every person whose fidelity is thus insured, is required to pay a small premium annually, and thus his dealings on this score are entirely with the insuring company; his employer has no trouble in hunting up references, and no worry in looking after him on the score of integrity; that he will be honest is guaranteed, and all the employer has to do is to see that he performs his duties satisfactorily. So much have these fidelity companies simplified this matter of giving bonds for individual character, the Legislature of this and several other States have passed laws permitting the judges of courts to accept the fidelity company bonds in all cases where two or more individual bondsmen were previously required. This is a convenience to the courts, the person requiring to give bonds, and to property owners who are liable to be called upon, very much to their annoyance, to go on the bond of friends. These companies have occasionally been called upon to make good the indemnity they contracted for, but in no instance have they been found at all backward—the money promised in the fidelity contract has always been forthcoming promptly. In one instance one company had to pay \$100,000, and though it rendered a call upon the stockholders necessary, the entire sum was paid without delay.

If the integrity of individuals occupying positions of trust, or compelled by the courts to provide indemnity, can be satisfactorily insured, why is it not feasible to insure individual credit in a similar manner? We were in a Maiden Lane establishment a few days ago, when a young man came in for a bill of goods that he had ordered. He was informed that inquiries made regarding him were not satisfactory, and that he could only have the goods on payment of the cash equivalent. He would have been spared considerable annoyance if he had been able to have presented a credit guarantee from a respectable and responsible company. It is certainly no more hazardous to insure the personal responsibility of an individual for a few thousand dollars than it is to insure his moral character. Of his personal pecuniary responsibility the insuring company can obtain actual, tangible evidence, with possible indemnifying security, while no absolute knowledge of the moral status of a man can be obtained. He may be of good family, with no bad habits, prominent member of the church, and yet he may sacrifice his character and standing, turn thief without a moment's warning, while the first suspicion of his honesty comes from the fact that he has taken up his residence in Canada. A Credit Guarantee Company would naturally perform, also, for its own protection, the functions of a mercantile agency—indeed, the two might constitute a single business enterprise. Having made inquiries regarding the financial responsibility of an individual, why could not the agency go still further and guarantee that responsibility? A company consenting to do this, having satisfied itself regarding the solvency of an individual, could say to him: "For such a sum paid in advance, we will guarantee your credit to the extent of \$5,000 or \$10,000, and will contract with your creditors to that effect." What a saving of time, trouble and anxiety that would save all persons interested. And the onus of establishing his right to favorable consideration would be placed where it belongs, on the person seeking credit, not as it now is, on the person who is granting him a pecuniary favor. The creditor class

would be relieved from the necessity of supporting mercantile agencies, and a vast amount of worry over "lame ducks."

There is no reason why such an insurance company should not be made profitable to its stockholders. When the hazards from fire, the perils to life from accident and disease, and the innumerable risks encountered by those who trust their lives and property to the mercies of wind and wave, can be insured against, most certainly the simple pecuniary hazards involved in insuring the credit of individuals engaged in legitimate business enterprises can be safely covered by a contract of indemnity. There is no more moral hazard involved in the transaction than in any other form of insurance named, and where such is suspected, it could be provided for by demanding security from the person insured. The great advantages of credit insurance lie in placing the responsibility for all inquiries as to the financial standing of those seeking credit upon one agency, and not requiring each creditor to make investigations for himself. When a merchant consults a mercantile agency now he is far from satisfied with what he gets, and there is no responsibility accompanying the reports made. The agency simply gives such information as it has been able to glean regarding the person inquired about. So unreliable has this become, that several of the trades have established agencies of their own to look after the persons engaged in such trade. But even these give no sort of guarantee; after all possible inquiries have been made regarding a person seeking credit, the seller still has to take all the risk, trust to his own judgment, and let his goods go or refuse, according as he is impressed by the vague information he receives. A responsible insurance company guaranteeing him against loss would save him all this trouble and worry. As we have said before, we are confident that such a company could, in the right hands, be made profitable to the stockholders, and the wonder is that some of the numerous promoters of insurance companies have not turned their attention in this direction.

Dead Capital in the Manufacturing Business.



FEW PERSONS, comparatively speaking, have an intelligent idea of the great amount of dead capital there is involved in the manufacture of jewelry. Not only is there a vast amount of unavoidable waste of precious metal, but the amount of money employed in the purchase or manufacture of necessary machinery, tools, etc., is scarcely equaled in any other manufacturing industry. We never had this fact so impressively borne in upon us as we did during a recent visit to a prominent factory in Newark. This is probably the largest and most completely equipped factory in this country that is devoted exclusively to the manufacture of gold goods in all their endless variety, and while it is not our intention to attempt a description of the numerous interesting processes involved in the production of gold goods, some allusion to the unproductive capital involved in the successful management of such an establishment will convey an imperfect idea of the vast amount of money stored up in the jewelry business in its thousands of factories scattered over the country. The first thing that strikes a novice with surprise on entering the business office of the factory is the apparent lavishness with which gold, silver and precious stones are scattered about, portions in finished goods, other portions in an unfinished state, still more of the "raw material," while portions and bits of goods yet to be assembled and put into the completed pieces lie about with a looseness that is severely tempting. But all this is a part of the admirable system that prevails here, as in every other factory; the proper person has an exact knowledge of every piece and particle, knows where to put his hand on what is wanted at any moment, and, above all, some individual is responsible for each and every piece of metal or stone that enters into the construction of the goods. From

the moment the material is issued for the manufacture of a certain quantity of a particular pattern, individual responsibility for the material begins, and, although the responsibility changes frequently during the different processes of manufacture, it never ceases, but accompanies the order from room to room, from workman to workman, and from the factory to the salesroom, never ceasing till the goods have passed into the hand of the consumer—then the quicker the piece is lost, the better it is for trade. In introducing new goods, the first thing is to get the design, and then follows the making of the dies required to reproduce the designer's idea in metal, with the desired ornamentation. The making of the dies is a trade by itself, requiring great skill and special mechanical ability. A single piece of jewelry, a lace pin for instance, may be made up of half a dozen different pieces of metal, for each of which a special die has to be cut in steel. The accumulation of these dies in a large factory is something enormous, requiring a large amount of space for storing them. As fashions are constantly changing new dies have to be made, and as this is a costly operation, the amount of dead capital thus tied up in dies is something marvellous, especially as there is a great reluctance to ever destroy a die, or to dispense with a pattern. In the factory named, these dies have been collecting for many years, and the storage room they require is equal to a large house. Then there must be some one to keep track of them and know precisely where to go when one is wanted, so closets are demanded in which they can be kept and classified. The machinery in a factory of this kind is largely of delicate and intricate construction, involving much expenditure of money in obtaining it. Where several hundred persons are employed, there must be an almost endless amount of machinery of various kinds, and while the greater portion may be simple in its character, other portions are so intricate as to seem to be almost possessed of human intelligence. Every work bench is specially constructed so as to save the waste of precious metals that unavoidably occurs while passing through the hands of the workmen. All filings, scrapings, dust, etc., fall into a metal cup in the work bench, and every night the workman is required to turn this in at the office. The clothes of the employees gather gold dust, the floors and benches become permeated with it, it clings to hands and face, and even the atmosphere is charged with it. In every conceivable way the waste of the precious metal is going on, and, in spite of every effort to recover it, an allowance for waste has to be made upon every issue of metal made to the workmen. A considerable sum has to be charged up to this account every year.

Among the items that must be charged to the dead capital account are the expenditures made for labor, machinery and special appliances for recovering the waste gold and other precious metal. In the basement of the factory are large tanks, overflowing into each other, into which is led the water from the sinks on the different floors of the factory where the men wash their hands. In these tanks the gold washed from the hands of the men is precipitated, and then passed off into the sewer in the street. But so impalpable is this metal, that some of it is still held in solution after having passed through the three settling tanks, and an ingenious man has placed a device in the sewer for the purpose of recovering what finds lodgment there. He realizes several hundred dollars a year from this source. All the sweepings of the factory are led into the basement by a wooden chute, and there it is burned, the ashes being saved and run through an amalgamator, where the gold is recovered by quicksilver and retorted. Even the waste from the retort finds a purchaser, and this waste is subject to still other processes, in which chemicals are employed, to extract still more gold from it. At intervals the floors and work benches, and even the aprons of the workmen, are burned, and the accumulations of gold therein recovered. The machinery and labor required to conduct the various operations of recovering the waste gold forms an important item of expense.

The factory itself is an extensive building, four stories in height and covering a good portion of a city block. It is fitted with the most approved methods of lighting, heating and ventilation, and in

its construction and fitting consumed a large sum of money. Hundreds of workmen and women find employment under its roof, and hundreds of others derive their subsistence from the wages disbursed each pay day. This is but one of numerous factories located in Newark, which combined give employment to thousands of working people. Each one of these is loaded with an amount of dead capital proportionate to the volume of its business and the length of time their proprietors have been in business. This is an item that should be taken into account when the trade attempts to figure out the profits in the jewelry business, or to fix prices of goods. Every article produced should carry its proportion of this dead, but necessary, capital, and the manufacturer who neglects to figure on this when making the prices for his goods does an injustice not only to himself but to every other manufacturer. The percentage of profit in the jewelry trade has been reduced to such an extent of late that it is well to recall some of the items of cost that are not always in evidence.

Gossip of the Month.

THE election in New York city last month was one of unusual interest and excitement. The labor interests had nominated Henry George for Mayor, and the indications were that he would develop a very large vote. The Democrats united all factions of that party upon Abram S. Hewitt for Mayor, and as his record is that of an honest man, it was conceded that the contest would virtually lie between him and Mr. George. Nevertheless, the Republicans nominated Mr. Theodore Roosevelt, a young man with an unblemished record and a reformer of pronounced opinions. All three of the candidates were recognized as able and honest men, but as the socialists and anarchists took up Mr. George and claimed him as one of them—a claim to which some of his writings gave a color of truth—the more conservative citizens were willing to do almost anything to secure his defeat. Many Republicans, feeling that Mr. Roosevelt had but little chance for being elected, threw their votes in favor of Mr. Hewitt, regarding this as the best means of securing the defeat of Mr. George. As a result, Mr. Hewitt was elected and Mr. George had a larger vote than Mr. Roosevelt. This is by many regarded as unfortunate, for while New York is secure in having elected an honest and trustworthy man for Mayor, the fact that the labor party cast a larger vote than the Republican party will, it is feared, give confidence to the dangerous demagogues who affiliate with the labor party, and that the result will be a formidable organization of socialists and other dangerous elements in society that will deceive the laboring men, and lead them into politics to an extent that will be dangerous to the peace of the community. It will be a sorrowful day for the honest workmen of the country when they permit themselves to be used as cat's paws by professional agitators and demagogues or their votes to be controlled by political hucksters. All right minded men realize that the prosperity of the country is largely in the hands of the laboring classes, and are desirous of seeing justice done to labor at all times, but the moment the workmen consent to be used politically for the advancement of non-working demagogues who advocate dangerous socialistic ideas, the conservative citizens will combine, regardless of party lines, to defeat them. Hurrahing for this or that political candidate will never improve the condition of the workmen. The value of labor is dependent upon the amount of brains and intelligence put into it.

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THE strike of the beef and pork packers in Chicago for eight hours work instead of ten, to which the employers had resolved to return, resulted in the defeat of the packers. Several thousands went on

strike and remained out for several days, but as they saw their places being filled by others they had the good sense to return to work and accept the ten hour system. But after a week or so they struck again, demanding a return to the eight hour system. This second strike was almost as brief lived as the former one, as all such unreasonable demonstrations must be. Last spring there was a very general movement on the part of workmen to secure eight hours as a day's work, but it was a great failure, the workmen themselves in many cases being opposed to it, as they saw clearly that a reduction in the amount of labor performed must necessarily lead to a reduction in compensation. The movement in the aggregate having failed, it is absurd to suppose that it can succeed in detail. The packers of Chicago cannot afford to accept eight hours for a day's work when their competitors in St. Louis, Cincinnati and other cities get ten hours work for the same money. This is a particularly bad time of year for workmen to forfeit their situations by striking; there are too many thousands now out of employment to warrant them in hoping that they can be successful in coercing their employers. There are, for instance, thousands of weavers unemployed in Philadelphia because the demand for the goods they make has fallen off in consequence of the market being overstocked; in New England, while the factory hands are talking of striking for higher wages, the mill owners are considering the propriety of closing their mills because the market is overstocked with their goods. The country is full of labor ready to adapt itself to almost any conditions at short notice, at wages that will enable the individual to live. Under such circumstances a strike of workmen in any particular line of industry is foolhardy and reckless. The few months of comparative prosperity that the country has enjoyed has not been sufficient to warrant capitalists and employers in counting upon a continuance of it, while many are extremely doubtful about business for next year. Workingmen will consult their own best interests by holding fast to what they have, and not add to the distraction and lack of confidence in the future that many employers now entertain.

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MOST persons are disappointed with the electric light that is exhibited in the torch of the Bartholdi statue of Liberty that was recently inaugurated with such a flourish of trumpets. The general supposition was that it would light up the whole bay as bright as day, throwing its beams far over the city. As a matter of fact, the light shines scarcely more brilliant than the light in any one of the light-houses in the harbor, and its effect is scarcely perceptible even in its immediate vicinity. Considered as one of a series of range lights, intended to guide pilots into the harbor, it is all well enough, but as a brilliant illumination it is a decided failure. This is all the better for pilots, who complain that electric lights are altogether too dazzling at close range to aid them in navigation, and for this reason the electric light erected at great cost at Hell Gate has just been discontinued. Its brilliancy was so great as to dazzle the pilots and increase the hazards of navigation in that dangerous channel. It is not so great a misfortune, after all, that Congress failed to provide for lighting the Liberty torch, and that, consequently, no one can take the responsibility of supplying the required electricity.

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"SAM" SMALL, the illiterate backwoods evangelist, who has been making something of a sensation in the West by his peculiar methods of preaching, recently got into trouble in Cincinnati by indulging his taste for jewelry and silverware in excess of his ability to pay. He ordered various goods from the local dealers, and after he had used them for a time it was found that he was unable to pay for them. The dealers then lodged a complaint against him with the church

authorities, who sought to hush the matter up by persuading "Sam" to return the goods, but the dealers did not want second hand goods. The affair caused some scandal but was arranged satisfactorily. The moral is that when a peripatetic evangelist takes a fancy to goods that are of the world worldly, dealers should exercise extraordinary caution in giving him credit. "Sam" may be a good enough preacher, but when he "acts such conduct like those" people are liable to lose confidence in his disinterestedness.

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IN OUR November issue, Mr. C. A. Bucklin, the well known oculist and writer on that subject, announced his willingness to give a course of instruction to a class who might desire to perfect themselves as opticians. This is an opportunity that should be regarded as a special boon to persons who are charged with the sale of optical goods, and are lacking in the technical knowledge necessary to enable them to deal intelligently with their customers. It is by no means necessary that a salesman of optical goods should be an oculist, but he should be able to fit lenses to the eyes of those desiring them, and a few lessons given by an expert oculist and optician, like Mr. Bucklin, will enable him to do this. The eyes of every individual have their peculiarities, and when these result in defective vision they naturally seek the aid of glasses to remedy the defect. Unless they are intelligently treated the optician is as likely to do them harm as good, and to destroy confidence in the virtue of optical goods. Mr. Bucklin offers to give instruction at very moderate rates, and the indications are that he will have full classes. Those desiring to avail themselves of his services should address Mr. S. W. Hale, Jewelers' Circular office, enclosing \$10 as a guarantee of good faith. The cost for the course, occupying two weeks, will be \$50, and will embrace such points of instruction as will enable the student thereafter to fit glasses intelligently to the requirements of his customers. While there are so many quacks going about the country claiming to be oculists and selling cheap glasses that are ruinous to the eyes, the very best way for legitimate dealers in optical goods to defeat such competition is to be able to do their work intelligently and thus give satisfaction. A customer who has been satisfactorily treated in respect to his eyes is the very best advertisement a dealer can have.

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A CORRESPONDENT made serious complaint in our November issue regarding the pertinacity of a certain class of commercial travelers, who never seem to know when to stop hounding a man whom they have determined shall buy goods of them whether he wants to or not. While it is undoubtedly true that there are some travelers who are entirely lacking in good manners and have but a superficial knowledge of what constitutes a gentleman, yet these are not to be taken as examples by which to judge a class of very enterprising men who are indispensable to the success of their employers. A very large proportion of the goods sold in the jewelry trade is sold by commercial travelers, and this could not be done if they were boors and idiots of the kind described by our correspondent. On the contrary, it is the rule among the better class of houses that their very best and most intelligent employees shall do the traveling. The traveler who sells the most goods is the one who receives the largest salary, and his success as a salesman is dependent upon treating his customers fairly, honorably and with proper consideration. No traveler who is habitually discourteous or ungentlemanly can hold his trade, and when his trade is gone his usefulness has departed and he is forced to look for employment elsewhere. A crusty, disagreeable traveler soon "plays himself out," and once he acquires a bad name he may as well quit the business, for his reputation travels faster than he can. Employers generally have a very good knowledge of the

men on the road in their line, and the services of the successful ones are always in demand; but the one whose trade is seen to be falling away from him finds his opportunities for employment to be growing fewer each year. Travelers have every incentive, therefore, to cultivate the good will of those whose custom they seek, and, as a rule, they appreciate this fact and govern themselves accordingly. Usually commercial travelers are bright, sharp business men, capable, honest, gentlemanly and fitting representatives of the houses that employ them; their judgment is often relied upon by their employers to a greater extent than they are willing to admit, and in hundreds of instances the traveler's route has led him into a partnership in the house he has so worthily represented on the road. There is no doubt, however, that during the past few years, when retrenchment has been the order of the day, some of the cheap goods men have put on the road a class of travelers whose sole recommendation was that they would work cheap. Very little can be expected of such men, and their employment is usually a disappointment to all concerned. Probably our correspondent encountered one of this class, and, if so, we cannot wonder at his indignation or the manner of its manifestations.

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OUR late Minister to Persia, Mr. S. G. W. Benjamin, has published a book entitled "Persia and the Persians," which is full of interesting descriptive matter relative to that people, their habits, customs, occupations, etc. Their love for all that is magnificent is well known, as is their appreciation of jewels and precious stones. Mr. Benjamin, speaking of the palace of Nasr-ed-Deen, says that in the center of the hall is a large table overlaid with beaten gold, and a long row of arm-chairs are massively splendid with the same costly material covering every inch of space. At the end of the hall, facing the entrance, is the famous Peacock Throne, brought from Delhi by Nadir Shah, covered with gold and precious stones in a profusion that places the lowest estimate of its value at not less than \$13,000,000. The magnificence of the Shah's audience hall is still further heightened by the fact that here also are stored many of the crown jewels. The reserve of coin and bullion which the Shah has saved from his revenues, equal, it is said, to a sum of \$30,000,000, is safely locked up in the vaults of the palace. But one need only see the treasures in the audience hall to obtain an idea that Persia is still a land of wealth, and that the tales of splendor recounted in Oriental story were not wholly the fictions of a fancy steeped in opium or b'hang. Among the spoils of ages gathered in the Shah's treasury are superb crowns and jeweled coats-of-mail, dating back four centuries to the reign of Shah Ishmael. In a glass case one sees a large heap of pearls dense as a pile of sand on the seashore. Diamonds, rubies, emeralds and sapphires catch the eye at every turn, sometimes flashing forth like a crimson or a green fire on the boss of a buckler or a helmet worn at the front of battle ages ago. One ruby there is in that mine of splendor which, on being placed in water, radiates a red light that colors the water like the blood of the vine of Burgundy. There, too, is a globe of the world, twenty inches in diameter, turning on a frame of solid gold; the surface of the earth is represented by precious stones, different colors being used to indicate the divisions of land and sea; the ocean is entirely of turquoise, and Persia is represented by a compact mosaic of diamonds. The famous Dar-i-noor, or Sea of Light, the second of known diamonds in quality, size and value, is kept carefully locked in a double iron chest, but is shown on rare occasions and is worn by his Majesty on great state days.

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THE annual dinner of the New York Jewelers' Association was given at Delmonico's on the evening of November 18, and in other

columns we present a full report of what occurred on that occasion. The President, Mr. George C. White, presided with his accustomed grace and dignity, introducing, with pleasant words, the several speakers, and contributing his share to the success of the dinner. It was, as is usual with these annual gatherings, a most enjoyable event, bringing together many of the veterans in the trade who scarcely meet except at these re-unions, and then fill in the time with anecdote and reminiscence till they renew their youth and feel good all over. The asperities engendered of an active business life are forgotten on these festive occasions, and each one seeks to extract from it the greatest amount of enjoyment possible. That they are all eminently successful in this is demonstrated by the great popularity of the jewelers' dinner, which is regarded as one of the most important social events of the season, and one upon which the talent of Delmonico's establishment is especially concentrated. It is impossible to transfer to cold type the effectiveness of the post prandial eloquence—the inspiration and the surroundings are lacking—but the language itself was caught by our special reporter and will be found in his report. We give considerable space to this event, to the exclusion of some other matter, for, as it occurs but once a year, the trade is entitled to all the good that can be got out of it, and those who were unable to be present may enjoy the wit and eloquence, i. not the dinner itself.

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TRADE continued good during last month, although not quite so brisk in some lines as it was in September. There was not such a falling off, however, as to bring any discouragement as to the holiday trade, which all expect will be excellent. Reports brought in by travelers and received generally from the retail trade are of a most hopeful nature, and unless something unexpected occurs there is likely to be a liberal demand for goods quite up to the end of the year. Then, when the books are balanced, 1886 will show a remarkably favorable trade as compared with several of its predecessors. Manufacturers are entitled to this, for never before have they offered so many new and attractive goods as they have done this year, having surpassed themselves in the originality and diversity of their designs, which have been worked out by skilled workmen with a degree of elaborateness and attractive ornamentation that have been duly recognized and appreciated. The workmen of this country have come to the front very rapidly of late years, and now have no favors to ask of their European brethren on the score of fine workmanship.

The Stopwork.

[BY M. GROSSMAN.]

Continued from page 360.

THE ESCAPEMENT.



TO BEGIN with the horizontal or cylinder escapement, I always thought the "chariot," a movable fastening of both the balance cocks, a rather superfluous complication. If the distance between the cylinder and wheel has been correctly pitched, it is only desirable to keep it intact, and the movability of the chariot is in danger for the good performance of the watch. On the other hand, no one will pretend that the correct pitching of a cylinder escapement will be a very difficult job, while the duplex escapement, requiring by its delicate nature the most perfect accuracy, is, in the majority of cases, planted without movable chariot; besides, the cylinder escapement admits, more than all other escapements, of being manufactured and planted by the system of perfect identity, and it would seem advisable to take advantage of this circum-

stance. The suppression of the chariot would render the movement more simple and easier of execution to a considerable extent, because the lower balance cock could then be omitted, by setting the balance hole in the same way as that of the wheel in the bridge, or, in the absence of this, in the plate itself. The necessity of the chariot is only a prejudice originated by habit and blind routine. If a cylinder escapement then is correctly pitched, it will be so for ever, and no inexperienced hand would be able to alter it; and as to those escapements which are incorrectly pitched, they ought not to pass examination without being corrected.

The disposition of the cylinder escapement being not so extended as that of the lever escapement, the space in the movement is not so much occupied, therefore the train, to begin with the center wheel, can be made one size larger than in the lever movement of the same diameter, in order to secure the advantages to be obtained thereby.

The cylinder escapement is at this period nearly superseded in almost all countries, except France, by the lever escapement, and with respect to this latter there are few more observations to make.

The arrangement of this escapement admits of a great variety, and in the first place the question must be settled, whether it is to be set in a straight line or at right angles. This latter system recommends itself by an economy of space, or, what is the same, by a more convenient placement of the parts. Thus it would allow the wheels, lever and pallets to be made larger for the same size movement. For the reason alleged for the sizes of wheels and pinions this might appear advantageous, but in the case of the escapement we have to consider it from another point of view. We must consider in the first place that in the intermittent action of the dead beat, or detached escapement, the inertia of the moving parts must be overcome at each vibration, and that the impediment must be reduced as much as possible. Besides, the sliding friction of the wheel on the pallet plane is of a very different nature from the rolling friction of the wheel teeth, and this former kind of friction increases considerably with the extension of the planes to be traversed. For these reasons the wheel, pallet and fork ought not to exceed certain limits in size, and they ought to be worked out as light as their necessary strength will allow. The length of the fork, too, must be restricted. I will not repeat here what I have treated in full detail, in my "Treatise on the Lever Escapement," Chapter IX, p. 62. The action of the fork and roller is also not of such a very delicate nature as to make us wish to execute it on a large scale, in order to verify easier its performance.

For the same reasons it is not advisable to make the wheel or other parts of gold, the specific gravity of which is here an objection. The arrangement of the escapement in right angles offers thus, as we have seen, an advantage by its economy of space, except in complicated constructions, where the space is restricted by other parts of the mechanism. It may be considered but little more than a matter of taste to employ the one or the other arrangement, still there is a slight difference in favor of the escapement in right angles with respect to the friction. The pressure which is acting on the pallet pivots may be considered a three-fold one: 1. The pressure of the wheel on the locking faces. This is exerted with the full power of the escape wheel, and acts on both arms in the direction of a line drawn through the locking edge of the entrance arm to that of the other arm, and will tend to wear the pivot holes in the direction of the second arm. 2. The pressure resulting from the decomposition of the force of the wheel when acting on the inclined plane of the pallet. It is, of course, much weaker, but it acts during a more extended angle of movement. It increases with the lifting angle, and has a tendency to widen the holes in the direction of a straight line from the center of the wheel toward the center of the pallet. 3. The reaction of the resistance in unlocking. It acts alternately to both sides of a line at right angles with the line joining the centers of balance and pallet. Both the effects under 1 and 2 take place equally and in

the same direction for any lever escapement, but the third one coincides in direction with that under 1, if the escapement is in straight line, while with the escapement in angle it falls into the direction of the one under 2, which is essentially weaker. This difference, which has also been explained in the above-quoted treatise, is of subordinate importance.

In all cases of this latter construction, the pallet holes, as a rule, ought to be jeweled, because the bushing of a worn pallet hole in a straight line escapement is more troublesome than in another one, as any deviation of the exact pitch must necessarily here produce a defect in both the actions of wheel and pallet, and of fork and roller.

According to the foregoing demonstrations, the diameter of the escape wheel in a lever watch ought not to exceed one-fifth of the diameter of the pillar plate, and then it will be a good proportion to have the acting length of the lever—that is, the distance from the pallet center to the acting edges of the fork—equal to the wheel's radius, or one-tenth of the diameter of the pillar plate. With these proportions the pallet center will be within the circle of balance, if this latter is not proportionally small.

There might be found a trifling economy in having wheel and pallet under one and the same cock, but it would have either to renounce the advantages of a short lever, or to make the escape pinion as short as the pallet staff, which is to lie under the balance. This ought to be avoided, because the stability of the axis is greater when the pivots are far apart. Therefore, the little additional trouble or cost of making a separate cock for the wheel ought not to be an objection.

The action of the fourth wheel into the scape pinion ought not to be placed too high, for, if otherwise, the good service of this depth, by its nature the most imperfect and most delicate of the train, might be endangered by the slightest alteration in the steady pins of the escape wheel cock. For the same reason, this cock ought to be placed so that a straight line through the pivot hole and the screw hole points toward the center of the fourth wheel, or nearly so, because then any bending of a steady pin will influence the depth in a less degree.

The balance cock, in the course of making or repairing a watch, must be very often removed and put on again, therefore it is of great importance to pay much attention to its steady pins, for if badly made they give much trouble. A well-adjusted cock, especially that of the balance, ought to be firm in its place; it ought to go easy into the steady pin holes, till at a distance of some tenths of a millimeter, and then be so firm that the escapement may be safely tried without using the screw. This result can only be obtained by steady pins of a conical form. I would not recommend the English way of screwing the steady pins in, because it is not easy, and does not offer the same surety of exact fitting as a pin driven into a round hole. The following is a way to do it, which I always found to answer perfectly well: I take a piece of wire, a little thicker than the hole, and file it to the ordinary taper of a broach, till it will enter about half way into the steady-pin hole, and holding the pin with the pin vise in a suitable groove of the wood in the bench vise, I apply the burnisher to its end, so as to burnish a length a little more than the thickness of the plate into a more conical shape than that of a broach. After this, if properly done, the conical part of the pin will enter fully into the hole in the pillar plates. Then I take a good broach, and make the corresponding hole in the cock wider, till the pin, thus prepared, goes in far enough to have its extremity level with the lower surface of the cock. This, however, is a matter of experience, because it depends on the relative hardness of the cock and of the pin wire, and on the respective taper of the latter and the hole. Then I cut the wire off, leaving a sufficient length projecting at the upper surface of the cock, and then, after putting the lower side on a piece of flat steel, with a hole in it only a trifle longer than the pin I drive the pin tightly in, trying it from time to time into the hole in

the pillar plate, till it holds the cock fast. The other pin is made in the same way, and a cock well fitted according to this principle goes on quite easy, till the pivot is in the hole, and then it gets more than sufficient hold by the last pressure, which may be exerted safely and without injuring the jewel hole. The conical steady pins offer the additional advantage that a small bending of them will not affect the position of the cock, because, in consequence of their taper form, they catch this hold in the plate merely by the part next to the cock, while the parts of the pin exposed to bending are free in the hole.

(To be Continued.)

Table Habits and Furniture in Ancient Times.



IF YOU had been asked to dine with one of the old Britons, you would have been invited to take your seat on the skin of a wolf or dog, spread upon the ground, and if your host was not rich enough to indulge in this luxury, a little bundle of straw would be used as a substitute. Your host and hostess, with their children, would have waited upon you with such marks of respect as belonged to the age, and after you had finished your meal, they would take your place and consume whatever you had left. You would have seen spread before you very little bread, but a great abundance of meat—venison, beef and the flesh of sheep and goats. Your drink would have been ale—very thin and insipid, and mead, a liquor made of honey and water fermented, and which was once regarded as the favorite drink of the pagan gods.

In the earliest period of British history the breadstuff was nothing but a porridge of flour or meal and boiled. Later on they improved upon this and kneaded the flour into a kind of tough, unleavened cake, which we should regard as very indigestible and difficult to masticate. There were no ovens in those times, and the bread was baked on a hot stone or a gridiron. The familiar story of King Alfred's burning the cake, which the good dame of the house, in ignorance of his rank, had set him to watch, will here be likely to recur to the mind of the reader. The bread was always made by the mistress of the house, for there were no bakers' shops even in London until 1443. The first bakers were the monks, and the bake-house was sometimes attached to the church. The profession of a baker ranked very high. The bread most commonly used by tradesmen in early days was made of barley, or rye mixed with peas. Wheaten bread was regarded as a special luxury, and it was a long time before it came into general use. As to the table furniture of your British host—if the wolf or dog-skin could, with any propriety, be called a *table*—you would have seen very little of any sort; forks, and spoons, and plates, and tumblers, for each individual's use were unknown, and the knives looked like long, pointed daggers, used by the master of ceremonies to convey to his guests their portion of meat, which they would then dispose of with their fingers as they best could.

If you were invited to dine with a Saxon gentleman some generations later, you would have found a great deal more of style and form. You would have been seated at a large, square table, surrounded by long benches, the order of rank being carefully regarded in the seating of the guests. By a law of Canute, it was allowable to pelt with bones any person who took a higher seat than that which belonged to him. The mistress of the family sat at the head of the table on a platform slightly raised, and distributed the bread. Hence the title of *lady-loef-dien*, or server of bread. The men and women were seated apart. The table was covered with a rich cloth, and a cup of horn, silver or gold, given to each guest. The food was plentiful but plain, and an old picture represents a man cutting a piece of meat off the spit upon a plate held by a servant underneath.

with cakes of bread, oblong, square and round dishes on the table. There was a very singular law in force at that time to the effect that "if any one entertained a guest of any sort in his house for three days, and the guest committed any crime during that period, his host was either to bring him to justice or answer for it himself; and, by another law, a guest, after two nights' residence, was considered one of the family, and his entertainer was to be responsible for all his actions.

If you had been a visitor in the family of one of the Danes at a still later period, you would have been expected to consume four meals a day and sit long at the table. The excessive drinking in which this rough people indulged led to frequent scenes of discord and cruel violence.

After the Norman Conquest, 1066, the four meals were reduced to two, and later on, in the reign of Edward III., laws were enacted to restrain the excessive luxury and extravagance which had prevailed. Notwithstanding this, we read of the king's giving an entertainment of thirty courses, the fragments of which sufficed to feed 1,000 persons. French cooks were introduced into England about this time, and the art of cookery became more elaborate than it had been before. Breakfast was not a usual meal with our ancestors, except when they had four meals every day, and in the time of Edward the dinner hour was nine o'clock in the *morning*.

Richard II. kept two thousand cooks, and about this time breakfast began to assume some prominence as a meal, and among the items served we read of "bread and wine, boiled beef, beer, salt fish, brawn, mustard, etc." On a saint's day there was a great display of paste and jelly in the form of angels, prophets and patriarchs; and on other occasions the figures of various animals were displayed. At the banquet a side table was provided for the ale and wine, which was handed to the guests in wooden and pewter goblets. The hours with the nobility were as follows: Breakfast at seven, ordinarily consisting of herrings, beer, wine and salt fish; dinner at ten, and usually lasting three hours; supper at four and a collation at nine in the evening, on which occasion a gallon of beer with a quart of warm wine mixed with spice, served for a small family.

The Record Book of the Duke of Northumberland's Household, in the 16th century, directs that the inmates shall rise at six o'clock, dine at eleven, sup at four and the castle gates to be closed at nine. The difference in the stated hours, between the ancient times and our own, is in itself very noticeable; but it seems to us still more strange that the people of fashion should have kept earlier hours than the working classes; and this was the case as late as the reign of Elizabeth, when the nobility dined at eleven and the merchants in London at twelve, and supped at five or six, while the farmers took their suppers at seven or eight, dining at "high noon." At this period the dining room was strewed with rushes, and the men dined with their hats on their heads.

Forks were first introduced in the reign of James I, and their use was ridiculed and protested against as tending to effeminacy. The spoons were made of the roots of box, brass and horn, and folded up like a modern jack-knife.

The Duke of Northumberland, to whom reference has just been made, had three country seats but only one set of furniture; so that when he removed from one house to another the family carried with them their beds, tables, chairs and kitchen utensils. It was also the custom in former days to remove the windows from one place to another. The pomp and circumstance which attended the most trivial matters in the household is seen in an order issued for the proper mixing of mustard, which thus begins: "It seemeth good to us and our council—" and so on.

The drinking of healths was originally a religious ceremony, and the saying of grace at meals dates back to the remotest antiquity. It is a most appropriate and seemly custom, although, we regret to say, it is not always observed with proper solemnity.—*Bishop Clark, of Rhode Island.*

Optical Department.

[EDITED BY C. A. BUCKLIN, A. M., M. D., NEW YORK.]



AM most thoroughly convinced that the system of enquiries and answers, which has been a prominent feature of this department, is a very practical and successful method of reaching satisfactory results. The difficulties which one man writes about are the same difficulties which many others must have encountered.

The following letter is from a man who follows the combined calling of *Watchmaker, Engraver, Jeweler and Optician*. The clearness with which he writes requesting information on optics is astonishing, and it is still more astonishing to me, that a so thoughtful and intelligent man is not provided with all the necessary facilities to make his optical knowledge highly remunerative.

In the January number we will commence to describe in detail the facilities and appliances which are necessary to drive an optical business into the thousands.

LINDSAY, ONT., Oct. 16, 1886.

Dr. Bucklin :

SIR—We trust that we will not be imposing too much upon your time and attention in asking your assistance in the following case :

(1.) Customer is a young man eighteen years of age.

(2.) Had inflammation of eyes two years ago. The trouble was principally with the eyelids (we thought, perhaps, granular), but his physician did not tell him what was the matter. He was under treatment for several weeks, and at that time was—to use his own expression—"just about blind." Since then his sight has been defective. His eyes have gradually been getting *stronger*, but he does not know of any marked improvement in his *vision* during the last past year.

(3.) Tested with types at twenty feet. He can see the CC letter, but not the C letters.

Best vision is obtained with —13 spher. or —14 spher. With these lenses he can see LXX line very well, and can just make out the T of the L line of letters, but no others of the L line.

We have no cylindrical lenses.

The astig. disc being very indistinct at 20 feet. He was placed 7½ feet from the card, this being the limit of distance at which any of the lines appeared clear without glasses.

(4.) Tested at 7½ feet.

Without glasses the I lines appear much the blackest. *The diagonal lines being more indistinct than the horizontal line.* —7 lenses reverse, and make — lines as dark as the I lines were without lenses and *vice versa*.

(5.) Without glasses he can read this, **they selected Peterborough** print at about 13 inches, but not well.

(6.) The position of dark lines does not change with change of distance.

(7.) Convex glasses make vision worse and increase the astigmatism.

(8.) He is studying at school, and requires to see at a distance. He can manage for close work, but of course not with ease. Has no trouble of the eyes now except visual.

(9.) Both eyes are alike in all particulars as above. Will it be possible from this data to fit him with lenses. Could you send us a pair of plano cylinders of the proper strength—that in combination with spher. lenses—we could show him exactly what we could do for him, and by means of which we could take his order with reasonable hopes of giving him satisfaction? He is desirous of procuring glasses as soon as possible. In the meantime he is using —14 spher. as they aid him greatly.

We have some other cases—one of myopic astig'm—and one of cataract (which latter has been operated upon), which might be of interest to your many readers, and if it does not encroach upon your time too much we will speak of them at some other time. We remain

Yours respectfully,
BRITTON BROS.
Every skilled optician should be able to recognize opacities of

the cornea or lens, whether hereditary or acquired from disease. Light focused by a convex lens $2\frac{1}{2}$ upon the cornea in a dark room, at an angle of 45 degrees, with a line representing the optical axis of the ball, will always demonstrate any opacities of the cornea.

From the description of the above case I conclude that with *proper* glasses vision would be quite satisfactory.

Now if -14 is the best spherical lens he can find, and -7 is the *weakest* concave lens which reverses the black lines on the face, the patient would require theoretically -14 combined with -14 c. axis 180 .

Possibly a weaker cylinder would bring the distant objects out distinctly, in which case it would be the one required. I think -18 would be the weakest which would be required. I, however, think it is a little beyond the sphere of practicability to determine this point without practically experimenting with the lenses.

It sometimes taxes the ability of a most ingenious experimenter to arrive at a satisfactory conclusion with the lenses and patient before him.

If, however, the -7 is the weakest lens which reverses the lines, you can try at least -16 c, ax. 180 , with considerable assurance. Such lenses can be obtained from any manufacturing optician at a very moderate cost, or probably can be borrowed. Not having any myself, except those in daily use, I could not furnish them.

EASTHAMPTON, MASS., Oct. 22, 1886.

We have tested with ophthalmoscope a young lady's eyes, but with very unsatisfactory results. She is now using a pair of convex specs, 9 in. focus. She can see fairly with her left eye with those at about 20 inches distance, but with her right eye not at all. We could not find anything in the instrument which would make her see with her right eye so as to enable her to read at 14 in. distance. But we found this combination the best of any: $+5$ spherical with ($+20$ cyl. 90°). With this she could just make out a word or two on the card at about 9 inches.

With any other combination she could not make out a word. Now we don't want to pay for a pair of lenses unless they are liable to help her, and perhaps you or Dr. Bucklin can help us out. We thought she ought to have a $+8$ for the left eye, and this combination, as above, for the right. Now will those two probably focus together?

She has been using a pair of eye-glasses, with Burbank's pat. adj. nose pieces, and would prefer them put up same way. Thinks probably No. 300 in nickel would suit. Respectfully,

TAINTOR & MCALPINE.

It is well for us to learn what cannot be done as well as what it is possible to do. Most young persons having this degree of far-sight, who have defective vision in one eye, have, or have had at some time, a slight cast in one eye, which has broken up binocular vision, and greatly damaged the acuteness of vision of this eye, so that it can never be corrected or improved in a satisfactory manner by lenses. I believe that a simple pair of convex 9 will give the best satisfaction in the above case. Could the vision of the imperfect eye be brought up to the normal standard, or near to it, a separate correction could be attempted with some prospect of success.

TRENTON, N. J., Oct. 19, 1886.

Dr. Bucklin:

DEAR SIR—Several years ago patient, aged now 55, in good health, requires No. 12+ (3.25) glasses to read. Can see with one eye.

Was struck with wood in left eye. Never was treated; leaving a scar over pupil. Can see better with it at night than in the day, the pupil being larger admits a greater range of vision or light. Can you help it, or cure it? I examined it with the ophthalmoscope, and the scar is plainly visible on the outside of pupil in the center. Respectfully,

GEO. F. APPLGATE.

For a complete answer to the above I refer my readers to the

article which appeared in THE CIRCULAR, entitled "Sympathetic Diseases of the Eye." In these cases, if the *seeing* eye begins to show symptoms of being affected, such as seeing dark clouds, flashes of light, or is constantly irritated, the offending eye must be removed, or complete blindness ensues. As long as the good eye shows no symptoms, the usual motto is "Watch and wait."

All those interested in this subject should look up and re-read the article on "Sympathetic Diseases of the Eye." They can then draw an intelligent conclusion for themselves.

TRENTON, N. J., Oct. 19, 1886.

Dr. Bucklin:

DEAR SIR—Young lady, about 19 years, been studying hard. Can read without glasses at about 14 inches. Complains of trouble in eyes, pain, and cannot see blackboard exercises at short distance. I cannot get any results or reading letters (40 ft. block) at 16 ft., with either $-$ or $+$ lenses. Cyl. 27, dioptic $+$ improves the radiating lines at 8 ft. Can I give her glasses to improve or make distant vision normal? Health good. And oblige, Yours truly,

GEO. F. APPLGATE.

If you can bring her distant vision up to the normal standard with $+$ cylindrical lenses, you certainly should do so, and the patient will be grateful for the comfort she derives from the lenses.

With certain spherical lenses (concave) which make distant vision distinct, it is possible to do harm by using them injudiciously, but with cylindrical lenses which improve distant vision, it is impossible to do anything but good.

A most interesting case has just come to my notice which never, as far as I can discover, has been observed before in America. There are only two, which have been observed by Erbe, a specialist in nervous diseases in Germany. The young man is about thirty years of age; every muscle in his body when struck or irritated contracts violently, or when forcibly contracted it fails to relax for some seconds, there is no muscle in the body which is not thus affected. If the eye-lids are forcibly closed some seconds elapse before they can be opened. If he is requested to look to his extreme right it is some seconds before he can straighten his eyes or look to the left.

He is now cross-eyed. When this defect first began to show it only appeared occasionally, now the internal muscles are more or less shortened, so that it only occasionally happens that he can look straight.

If you hold a pencil within fourteen inches of his eyes he can fix both eyes upon it; if you remove the pencil suddenly to twenty inches he cannot relax his internal muscles; he fixes with the left eye by making a movement outward while the right eye makes more than a corresponding convulsive movement inward.

He being perfectly conscious of the change from binocular vision to monocular vision, and will tell you promptly when the change takes place. The acuteness of vision is nearly normal and equal in both eyes. This individual has the power of seeing binocularly when the object is placed where it is possible, and also has the power of ignoring binocular vision when the object is removed beyond this point.

In the dark he sees much better with the right eye than with the left, which is due to the right pupil being always a little larger than the left.

If he sits down in a chair and remains in any one position for a length of time without moving, he is unable to get up; every muscle of the body if caused to contract forcibly remains firmly contracted, and can only be relaxed after some seconds.

Any of the muscles upon his body, when in a state of contraction, stand up like lumps of iron at least one inch high, and representing the entire shape of the muscle. If the hand is firmly closed it cannot be opened. It is the most remarkable case I have ever seen.

It appears that the prospects of establishing a school in this city for fitting persons to become skilled opticians are flattering. One application has been received from Lincoln, Neb., one from Elmira, N. Y., one from Buffalo, N. Y., and another from Trenton, N. J. At the suggestion of several active business men the instruction will not commence until January 20, at half-past two o'clock. All applicants should remit to Mr. Hale the balance of their fee on or before January 1, in order that I may have sufficient time to notify all students, should the requisite number fail to qualify, of which I think there is little danger. Should the class fail to form, Mr. Hale will promptly return the money advanced. I can safely say to those who do not desire to engage in business on their own account that the number of large jewelry dealers who are willing to take any young man who is thoroughly skilled, practical and equipped to do optical work properly are innumerable.

On Repairing and Examining Watches.

[By CLAUDIUS SAUNIER.]

Continued from Page 348.



THE BALANCE spring may be cleaned by laying it on a linen rag doubled, and tapping it gently with a brush charged with lather, then dipping in water and alcohol in succession. The alcohol may be used hot or cold; its action is, however, more rapid and effective in the former case. But there is no occasion to use hot alcohol except when dealing with substances, such as wax, that resist its action.

Essences and Benzine.—The employment of essences for cleaning watches is becoming more general every day. They are to be obtained at all the material stores, together with full instructions in regard to their use. A few observations may, nevertheless, not be out of place.

The objects are left in the solution for a few minutes in order to allow all adhering matter to dissolve, but they must not remain too long, as certain qualities of benzine, etc., are apt to leave stains. Dry the pieces on removing them, and finish by passing over a fine brush that has been charged with chalk and subsequently rubbed on a hard crust or burnt bone; as has already been observed this will produce a brilliant surface on either gilding or polished brass.

The following composition, the ingredients of which can be obtained at any drug store, has been strongly recommended to us by a skillful watchmaker: 90 parts, by weight, of refined petroleum; 25 parts, by weight, of sulphuric ether. The objects are immersed for several minutes; indeed, they may remain a longer period without danger, and on removal from the bath they are found to be clean and bright. It must not be forgotten that many of these essences are liable to ignite with the mere proximity of a lamp.

MOUNTING THE WATCH.

The three following rules must be observed in arranging a system of mounting a watch: 1. Avoid taking up the same piece two or more times. 2. Hold it lightly, as any pressure will produce a mark. 3. Keep it as short a time as possible in the fingers. Any linen rag must be free from fluff, but rags of all kinds should, as far as possible, be replaced by certain kinds of tissue paper. The best kind will be that which, while securing a given degree of pliability, will best prevent heat and moisture from passing through. Blue-shaded tissue paper should be avoided, as it is often found to encourage the formation of rust on steel work.

The following order is adopted by some excellent watchmakers in putting together the ordinary kind of Swiss watch; it may either be adopted altogether or modified, as experience dictates. Commence by putting the several parts of the barrel together, attaching it to the bar, and observing the directions given farther on in regard to the

distribution of oil. Owing to the position of the stop finger, it is sometimes found that the mainspring must be set up either one-quarter or three-quarters of a turn. Very often one-quarter is not sufficient, and in such cases it is necessary, before putting together, to ascertain that the spring admits of at least 5 or $5\frac{1}{4}$ turns to the barrel. If it will not allow this amount and yet has to be set up three-quarters of a turn, too great a strain will come upon the eye of the spring in winding. Fix the chariot with its end stone on the under side of the plate.

Replace the fourth wheel, making sure that it is free and has no more than the required end shake and is upright. Then the escape wheel, testing it in a similar manner. See that the teeth have sufficient freedom on both sides of the cock passage, then make the two wheels run together with a pair of tweezers or pegwood in all positions of the plate, to make sure of everything being free.

After attaching the index and end stone to the balance cock and the balance spring to the balance (observing that the center of the stud is against the dot on the balance rim), place some oil in both the balance pivot holes, adjust the balance to the cock after placing a drop of oil in the cylinder (though a much better plan is that to be given at some future time), and set in position on the plate. Some workmen apply a drop of oil to the top of the scape wheel pivot hole before setting the balance cock in its place, but others prefer only to add the oil after the escapement has been tested. Placing a small piece of paper first between the balance and cock, and then between balance and plate, ascertain whether the escape wheel occupies its correct position in reference to the cylinder, in order that the escapement may act properly. This test is especially necessary in dealing with very thin watches, or those in which the cylinder banking slot is exceptionally narrow.

The barrel bar is now fixed to the plate.

Set the third wheel in its place and lastly the center wheel, after putting a little oil on the shoulder of the bottom pivot. Before putting the bar over it, apply oil to the top pivot in a similar manner; then screw it down. After this is done screw on the third wheel cock.

Now, apply a small quantity of oil to the two center pivots, and very lightly to the others that have not already been oiled; give a turn to the key and listen to the tick of the watch in all positions. This should always be done before replacing it in the case.

After passing the slightly oiled set hands arbor through the center pinion and adapting the canon pinion to its end, reverse the watch, passing the end of the center arbor through a hole in the riveting stake, so that the watch is supported on the end of the canon pinion; a light blow of the hammer on the square end of this arbor will then suffice to drive the canon pinion home. Some do this before replacing the movement in its case and some after.

Add a little oil to such pivots as have not already received enough, and fix in their places the remaining parts of the motion work, the dial and hands; the watch then only requires to be timed.

PRECAUTIONS TO BE OBSERVED IN APPLYING OIL.

The method of distributing and applying the oil is of more importance than might be thought, and has a very marked influence on both the time of going and the rate. Oil that is very fluid may be used for the escapement and fine pivots where only a small quantity is needed and the pressure is slight; but it is not suitable in other places on account of its tendency to spread and thus to leave the rubbing surfaces. If too much oil is applied the effect is the same as if there had been too little; it runs away and only a minute quantity is left where it is wanted.

Barrel.—It is not enough to apply oil to the coils of the spring; some must also be placed on the bottom of the barrel. Before putting on the cover, slightly lubricate the shoulder of the arbor nut that comes in contact with it; by doing so, when oil is applied to the pivot after the cover is in its place, this oil will be retained at the center of the boss in the cover. Moreover, it will not then be drawn away by the finger piece, passing from this to the star wheel.

The oil applied to the upper surface of the ratchet to reduce its friction against the cap must not be in such quantity as to spread on to the winding square. It is a good plan to round off the lower corner of this cover.

Center Wheel.—The observation made above in reference to the oil applied to the barrel cover may be repeated here. By proceeding according to the directions given when speaking of mounting the third and center wheels, a few paragraphs back, and adopting the precautions enjoined in a previous number, when treating of the center wheel and bad uprighting, it is possible to make sure of the pivots lasting for a long period.

Escapement Pivots: Cylinder.—When the drop of oil is introduced into the oil cup of the balance pivot hole, insert a very fine pegwood point so as to cause the descent of the oil; a small additional quantity may then be applied. When this precaution is not taken, it frequently happens that in inserting the balance pivot its conical shoulder draws away some of the oil, and there is a deficiency both in the hole and in the end stone.

As has been already noticed, some workmen place a single drop of oil within the cylinder, and when the escape wheel advances each tooth takes up some. This method is unsatisfactory, because the earlier teeth receive such a quantity of oil that it runs down the pillars, where it is useless and merely tends to increase the weight of the wheel. A much better plan is to put a very small quantity in the cylinder and on the flat of each tooth, or every second or third tooth. It will thus be evenly distributed and will not tend to flow away.

The scape wheel pivots require but a small quantity of oil. It often happens, however, that, owing to carelessness, the workman applies too much and it runs down to the pinion. The leaves will generally become greasy and stick while the pivots are running dry.

TO EXAMINE AN ENGLISH MOVEMENT.

As has been already observed when speaking of Swiss watches, many of the remarks made in speaking of the Geneva movement are equally applicable to that of the English construction, and any intelligent watchmaker, on reading the sections treating of this branch, will be able to select for himself whatever has a bearing on the English watch without difficulty. It will be well, however, to supplement it by the special directions contained in the four following articles.

(To be Continued.)

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of October 12, 1886.

350,903—Watch Plate. A. Troller, Assignor to Rockford Watch Co., Rockford, Ill.

350,904—Watch, Stem Winding and Setting. A. Troller, Assignor to Rockford Watch Co., Rockford, Ill.

Issue of October 19, 1886.

350,915—Cuff Button. J. Costello, Assignor of one-half to C. L. Watson and F. A. Newell, Attleboro, Mass.

351,239—Clocks, Pendulum for Electric. J. J. Abell and C. B. Gifford, Colesburg, Ky.

351,222—Timepieces, Electrical. S. Thackara, Camden, N. J.

351,085—Watch Crowns, Manufacture of. C. H. Yarrington, Assignor to Cheshire Watch Company, Cheshire, Conn.

Issue of October 26, 1886.

351,579—Button, Cuff. F. Cook, New Orleans, La.

351,434—Button, Separable. A. H. Graves, Central City, Neb.

351,392—Watches, Pendant Stem for. C. F. Morrill, Boston, Mass.

351,530—Watches, Pendant Stem for. F. W. Schimmel, Murray, Idaho Ter.

Issue of November 2, 1886.

351,746—Clock, Electric Alarm. F. E. Derrick and S. C. Brott, Lansingburgh, N. Y.

351,871—Watch Movement Holder. M. J. Lampert, New York, N. Y.

351,977—Watch Pendant Bow. J. R. Hare, Baltimore, Md.

351,919—Watches, Stem Winding Device for. O. Johnson, New York, N. Y.

351,920—Watches, Stem Winding Device for. O. Johnson, New York, N. Y.

Issue of November 9, 1886.

352,309—Clock. L. Feuerstein, Chicago, Ill.

352,320—Clock, Secondary Electric. F. J. Hedge, Jr., Providence, R. I., Assignor to Synchronous Time Company, Boston, Mass.

352,180—Clock Striking Mechanism. G. W. Burgess, Boston, Mass.

352,407—Timepieces, Electric Alarm for. F. Glasgow, Osceola Mills, Pa.

352,257—Watch Pendant Key. D. Nettekoven, Fort Shaw, Montana.

352,326—Watch, Stop. A. O. Jennings, South Port, Conn.

352,256—Watches, Safety Attachment for. D. Nettekoven, Fort Shaw, Montana Ter.

Coloring and Lacquering Brass.



THE FOLLOWING general description of the methods employed in coloring and lacquering brass work are useful for all metal workers, goldsmiths, mathematical and optical instrument makers, etc. Brass, it may be remembered, is an alloy of copper and zinc, and, by dissolving or cutting out either of those metals from the surface, a certain amount of variety of color can be produced. For instance, if brass is left for some time in moist sand it assumes a very handsome brown color, which, if polished with a dry brush, remains constant, and requires no cleaning or polishing. A darker or lighter green color may be imparted if a thin layer of verdigris is created upon the surface by means of dilute acids, which are to be left on until dry. The antique appearance imparted to the brass in this manner is very handsome and more or less durable. But it is not always possible, for want of time, to do this with each article, and a more rapid method for effecting the end is therefore necessary, and the simplest way to do it is to cover the brass with a coat of varnish. All the necessary work to be done is performed before the bronzing. The brass is annealed, dipped in old or dilute nitric acid until the scales can be loosened from the surface, and is then treated with sand and water and dried. The next step is to produce the necessary bronze. Although this word actually signifies a bronze color, it is rather loosely applied in the trades at present and applied to all colors. Brown of all shades is produced by immersion in a solution of nitrate or chloride of iron, the strength of the bath determining the depth of the color. Violet shades are obtained by immersing in a solution of chloride of antimony. Olive green by means of a solution of iron and arsenic in muriatic acid, polishing afterward with a plumbago brush, and, when warm, coating with a lacquer composed of one part varnish lacquer, four parts turmeric

and one part gamboge. A steel-gray color is precipitated upon brass by means of a weak boiling solution of arsenic chloride, and a blue by an attentive treatment with strong sulphide of soda. Black is much used for optical instruments, and is produced by painting with a platinum solution or with chloride of gold mixed with nitrate of tin.

The Japanese bronze their brass by boiling it in a solution of sulphate of copper, alum and verdigris. The success in the art of bronzing chiefly depends upon circumstances—for instance, the temperature of the alloy or solution, the proportions and qualities of the material used for alloying, the proper moment at which the article is to be withdrawn, its drying and a hundred other minutiae of attention and manipulation, require a skill only to be taught by experience. If the brass is not to receive artificial color, but simply to be protected against tarnishing and oxidizing, it is lacquered after having been thoroughly cleansed.

In order to prepare the brass for this coating, it must be dipped, after having been annealed, and rinsed and washed—dipped either for a moment in pure commercial nitric acid, and then washed in clean water and dried in sawdust, or immersed in a pickle of equal parts of nitric acid and water until covered with a white coating of the appearance of curdled milk, when the article is taken out, rinsed in clean water and dried in sawdust. In the first case the brass becomes lustrous, in the latter it becomes mat, which is generally improved by smoothing and polishing the prominent places. The article is then dipped for a moment in nitric acid of commerce, containing a little crude cream of tartar, in order to preserve the color up to the moment of lacquering and finally dried in warm sawdust. When prepared in such a manner the article is taken in hand to be lacquered, for which purpose it is first heated.

A simple alcohol varnish consisting of one ounce of shellac dissolved in one pint of alcohol, is used. To this simple varnish are added the coloring substances, such as Sanders' wood, dragon's blood and annatto, which increase the luster of the color. In order to moderate the shading of the color, turmeric, gamboge, saffron, Cape aloes and gum sandarac are added. The first color makes the lacquer reddish, the second yellowish, while the two, when mixed, give a nice orange.

A good pale lacquer consists of three parts aloes, and one part turmeric to one part of the simple varnish. A gold lacquer is obtained by adding 4 parts dragon's blood and one part turmeric, to one part of the simple varnish, while a red lacquer is produced from 32 parts of annatto and 8 parts of dragon's blood to one part of the varnish.

Lacquers are subject to chemical change by heat and light, and should, therefore, be kept in a dark place. The vessels in which they are stored are generally of glass or clay, and the brushes with which they are applied should be camel hair and have no metallic parts about them.

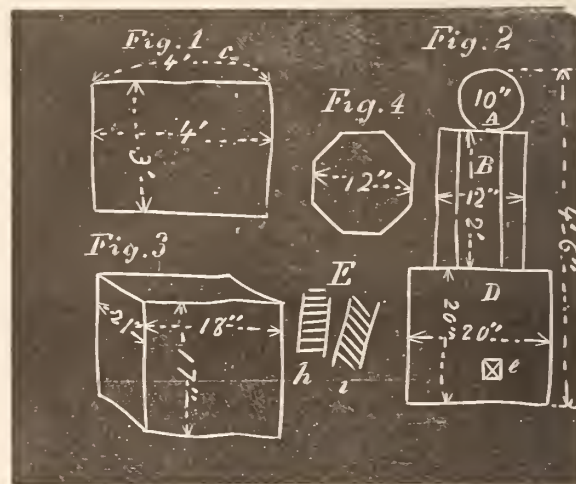
Free Hand and Mechanical Drawing.

BY EXPERT.



FOR MANY mechanical purposes a system of drawing known as "Hand Drawing" is of great use. An intelligently made drawing of this kind is all a good mechanic will need to guide him in constructing almost any mechanical device we can imagine. And the best of it is we need no instruments except a pen or pencil and some material to draw upon. In this way we can make a memorandum drawing of any piece of machinery we anticipate building. Or we can make working drawings of any machine we see if we are permitted to measure it. We will first consider the simplest application of such drawing, and then give the method of applying the system to a complete piece of machinery. There are a few arbitrary signs used to express certain conditions. To illustrate, suppose we

wished to make a hand drawing of a surface 3 by 4 feet. We would, with a pen or pencil, make an oblong of as near as we could judge this proportion, and to establish the exact size write the figures as shown in fig. 1. The arrow points at *a a* and *b b* denote the points at which we commence and end the measurement. Accent marks (') (") denote feet and inches, as, for instance, 4 feet, 5 inches would be expressed 4' 5". In fig. 1 the dimensions are given inside the oblong figure, but it could be just as well expressed or shown at *c* which is outside; the arrow points would tell us where the measurement commenced and ended. Parts of an inch is usually expressed in decimals, as, say, five and a quarter inches would stand 5.25". To show how a compound subject would be treated we will take fig. 2. Here we have a globe 10 inches in diameter resting on an octagonal shaft 2 feet high, supported by a cube 20 inches square. At *e* is a symbol denoting that *D* is a cube. If the base *D* was a block of unequal sides we can show it in an imperfect perspective, as shown at fig. 3, where the dimensions of all the sides are given. Whole heights or any similar measurements can be shown as at *d d*. Sections, as on the line *f f*, fig. 4, can be given to illustrate form, and, as the drawing is to no specific scale, the fact that the section was shown larger in the drawing would lead to no misunderstanding of its size even if the size at *g* was not given. In such drawing a ruler or compass are not used. But it requires a certain amount of skill, and this is, in a great measure, to be gained by practicing true free hand drawing. Shading is seldom used except to denote material, as, for instance, as at diagram *E*, where horizontal lines mean iron and diagonal lines wood parts. For the inventor such drawings are of incalculable



value, as he would require no drudgery of drawing instruments or scale except approximately. It is well to add a written description as the drawing proceeds, letting one keep exact pace with the other. It is better to write out a full description of the machine as it is evolved, than to depend on notes added to certain parts as at fig. 4. We will suppose we wish to construct a little electric motor for driving a watchmaker's lathe or a revolving case for a show window. We desire it to be different from any in use—in fact, our own. With this idea we start to devise—invent one. First, we must have some device by which we can convert the energy of the electric current into power. And as far as we know (for our knowledge of electricity is in its infancy yet), an electro-magnet in some form is the best method of obtaining this power. We next consider the size and arrangement we will require. To answer this we need some knowledge of electricity to guide us. Well, after taking the *pros* and *cons* into account, we make up our mind to use a U magnet made of $\frac{3}{4}$ inch round iron, bent up into the usual U form. The bar is to be 8 inches long before bending. We will wind this with copper wire, and the wire wound with floss silk to insulate it. Silk makes a thinner coating than cotton. The copper wire should be about $\frac{1}{8}$ of an inch in diameter before it is wound with silk to insulate it. We will wind these thicknesses of wire on our magnet. This magnet we will use as our source of power, and it will require about two Grove cells to work it. This is our source of power and we will

place it on a base of wood—a piece of walnut board 10 inches wide and 15 long. To secure our U magnet to this base, we will flatten the loop of the U and drill a hole through it, and firmly bolt it to a brass plate secured to the board so the magnet will stand rigid. Now, in making our drawing in illustration we need not give all the measurements; the text will supply this. But it is important that all the information necessary to construct should be given either in the text or drawing. We have now got our magnet in position; we have the approximate height to which it would rise above the base; as our iron bar of which the magnet was made was 8 inches, consequently the magnet will rise about 3½ inches above the base. An eighth of an inch more or less in height can be affected by the thickness of the brass plate on which the magnet rests. In making such drawings for practical use, the experienced workman will only establish certain points definitely, leaving some to adapt themselves to circumstances. This course is just as well, and a great economy in actual building or construction. Suppose we were working from a drawing made to exact proportions and the machine had to be built precisely to the dimensions given, it would involve much more labor and expense. What the writer wishes in this course of lessons or papers is to aid the reader to acquire practical ideas, not to fill his mind with technical terms and phrases which are really of little use, but to qualify him to accomplish desirable results speedily, and, at the same time, in a thoroughly mechanical manner. To illustrate, take a young man from some of our technical schools; he would know the theory of the electro-magnet and tell you what sized wire to use, and exactly the number of ohms the battery should yield, and make a drawing to exact proportions, and insist on the builder complying to the letter to each part. No doubt the result would be all right, but it would cost four times as much and be no better than the result a practical man would obtain at less expense. What the writer insists on is to have the practical keep full and even pace with the theoretical. The more science the better, but let your scientific man know also how to realize his ideas in brass and iron, materialize them, if I may be allowed the expression. Next time we meet we will go on with our electro-motion.

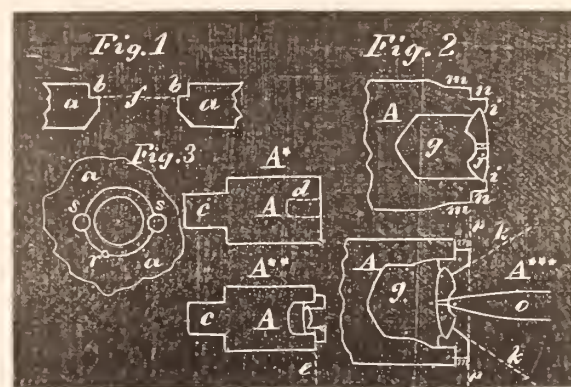
until it will just go into the sink at *b b*, fig. 1. The size can be nearly determined by using inside and outside callipers. But it is best to get the exact fit by trial, putting the plate up to the jewel setting or taking the entire chuck from the lathe. By fitting the setting carefully, so the friction will hold the setting in place when *A* is unscrewed from the lathe, we can test for end shake. After this is determined we mark how far the setting goes into the plate. We will suppose it to the line *e*; we now cut off the setting a little above this line. Our jewel is now nicely set and the inner face at *i i* finished as well as need be; but the side we just cut off is rough and unfinished. We have the brass piece *A* from which we cut the jewel setting; we now face off the end on the line *e*, diagram *A***, and turn a recess in the end which will just receive the offset *u u*, and let the part *m m* protrude as shown at diagram *A***. At diagram *A**** is shown the jewel setting complete with a portion of the chuck *A*. It will be necessary to use a little shellac cement to hold the jewel setting in *A*, pressing the jewel and setting firmly in position by a pegwood shown at *o*. In turning the beveled sink of the setting on the line *k* we must use a graver highly polished; this is done after the setting is shaped, *i. e.*, the face on the line *p* is flat and the chamfer *k* at the right angle; then, one light chip with the polished graver and it is finished. We now take the jewel and setting out of *A* and place it in the watch plate, again using cement to ensure its staying in place until the screws which hold it are in position. At fig. 3 is shown the jewel and setting in place, and in putting in the screws we drill a recess large enough for the screw head with scarcely half the sink (for the screw head) in the jewel collet. The drill of the size of the screw head is only allowed to penetrate to the depth of the screw head, when the hole is continued through the plate of the right size to be tapped out to receive the jewel screw. The sinks for the screws should be bottomed out flat with a rose drill. An old

Problems in the Detached Lever Escapement.

BY DETENT.



IN AMERICAN watches of the finer grades the jewel settings in the top plate are generally set in collets or bushes separate from the plate; this enables us to change a jewel very readily, but in the lower or pillar plate the jewels are set directly in the plate, and it is not always possible to raise the bezel which confines the jewel so as to safely insert a new one, and in the case cited in November number of this journal this was undoubtedly true, but it made no excuse for the botching manner in which the jewel was set. The writer went about the job in this way: He put the lower plate in the Universal lathe, and from the dial side turned a countersink for a separate jewel setting like the jewels in the top plate. At fig. 1 is shown a vertical section of the lower plate, the dial side supposed to be up; *a a* represents the plate and *b b* the countersink, which is ready to receive the jewel set up in its brass collet. To set a jewel we take a piece of brass wire larger than the setting is intended to be, and turn one end of it so it will allow a screw to be cut on it which will screw into the lathe like a wax chuck as shown at *c*, diagram *A**. After it is secure in the lathe spindle we center and drill a hole a little smaller than the jewel, as shown at the dotted lines *d*. At fig. 2 is shown an enlarged longitudinal section of the brass wire *A* and the jewel *j*. A recess into which the jewel will just go is turned, and the edges of the sink at *i i* burnished over the jewel. The next operation is to turn the recess *n n* small enough to go into the plate *a a*. The brass is now turned down at *m m*



ten-leaf pinion filed off square, and the leaves filed to an edge (at the end) make a nice flat countersink. After the setting is in place a guide pit is made at *r*, so we can restore the setting exactly to position after removing it. The guide pit *r* is more to bring the sinks for the screws *s s* right than for any other purpose, as it is hardly possible to get the screws exactly opposite. The face of the jewel setting on the line *p* can now be ground perfectly flat, and, of course, to correspond to the surface of the plate *a a*, and finally polished on a tin or zinc lap with diamantine and oil. Of course, we dissolve and remove any shellac from the jewel setting and plate, as it was only needed to hold them in the conditions required, as illustrated in diagram *A****, and for holding the setting in the plate as shown in fig. 3, until the screws *s s* were in place. We have now one train in order and we will proceed to put the escapement to rights. We first put the jewel pin parallel to the staff. The reader will now have to refer to the November number of this journal to understand the condition. We next set the bankings so the jewel pin will only barely pass out of the fork. To do this properly we put only the fork into the plates and secure them with a couple of screws; remove the hair spring and put the balance in place, and screw the balance bridge down. We place the jewel pin in the fork, and close the bankings in until the jewel pin can not escape on either side. We now keep opening the banking pins until the jewel

will just pass out of the fork on each side. We now put the entire train in and wind one turn, and try the pallets for lock. The tooth should only just catch on the locking face of each pallet, and if the pallet stones do not exactly comply with these conditions they should be made to do so by heating the pallets and shifting the stones. It is somewhat tedious taking out the pallets, heating them, tilting or manipulating them in some way until the required conditions are obtained. After this the bankings are opened a little to ensure a safe lock and free the guard pin from riding the roller. All this reads very simple and easy; and so it is in a watch as carefully made as an Appleton, Tracy & Co. if the fork has not been tampered with. The reader, of course, is aware that in the Waltham Watch Company's full plate watches the lever is secured to the pallets with two screws which permits the fork to be moved back or forward as regards the roller. We will suppose the lever has been advanced toward the roller; in this case we should have more than 10° of lever action before the jewel pin was freed from the fork. Now, let us consider how this would affect the pallets if we set them as directed above. We will suppose our pallet stones are set so that as the lever rests against one banking pin the tooth which engages this pallet just locks; we will say it is the entrance pallet. We next let the fork pass over and rest against the other pallet, and have the tooth which engages the egress pallet just lock. Now, we try our escapement by tilting the lever, and find that when we let the tooth fall from the ingress pallet instead of locking on the egress pallet, the tooth which should engage it strikes the impulse face, and so *vice versa* with ingress. What does this tell us? Simply that the fork has been carried too far toward the roller. A very simple little index can be attached to the pallet to show the action. But this will have to lay over until or next interview.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number Six.

Continued from page 343.

E. HOWARD & CO., THE HOWARD WATCH AND CLOCK COMPANY.



THOSE WHO have carefully followed the history of the Boston Watch Company from its inception in Roxbury until the time of its failure in Waltham, and perhaps have also read the biographical sketch which has been given of Mr. Howard, are now prepared to read understandingly the history of the manufacture of watches at Roxbury as carried on by Mr. Edward Howard and those associated with him there, after his return there in 1857. After the failure in Waltham Mr. Howard anticipated buying in the property and continuing there, as he had friends who were willing to assume the responsibility connected with the purchase. But the amount bid far exceeded their expectations, and he returned to Roxbury in June, 1857, and started up the old watch factory, which had been occupied during the last year as a clock factory by Messrs. Howard & Davis. The watch factory was now conducted by Mr. Howard in the interests of Mr. Charles Rice, until he (Mr. Howard) completed a settlement with his creditors. The clock business was also conducted at that time in the same manner. The whole business was continued by Mr. Howard for Mr. Rice until December 11, 1858, when the whole property was sold to Mr. Howard, who then associated his cousin, Albert Howard, with him under the firm name of E. Howard & Co., Mr. A. Howard having some two years previous completed his apprenticeship in the clock factory.

Mr. Howard commenced in Roxbury with a force of some fifteen workmen, the greater part of whom had come with him from Waltham.

Work was commenced at once on the tools and machinery that were necessary, aside from those which Mr. Rice brought from Waltham. With reference to these tools it might be said he claimed them as his individual property, having purchased them under the trusteeship. Mr. Howard now modeled an entirely different watch from what they had been making previously, the size alone remaining the same, viz., eighteen size. Parts of watches were soon completed, and about a year from the time of starting watches were ready for market. The top plate was in parts or sections, and called the seven pillar watch from the fact of seven pillars were used, four being the usual number in a full plate movement, but in this watch a greater number were necessary owing to the fact that the plate was made in so many parts. The escapement, it will be noticed, is planted in the same way that it would be in a regular three-quarter plate movement. The balances, which were gold and steel at first, were soon replaced by heavy compensation balances that were well loaded with gold screws and run over the center wheel, which brought them very high. The train was eighteen thousand or "quick beat," Messrs. E. Howard & Co. being the first in America to make a quick train watch. It was quite an innovation for that time to make a movement with a quick train, when all the English watches had slow trains and were accepted as the correct thing. Reed's Patent Barrel was also used here for the first time. It is the invention of Mr. Geo. P. Reed, at present a small manufacturer of fine watches in Melrose, Mass. Previous to his coming to Roxbury with Messrs. E. Howard & Co., he was with the Boston Watch Company in Waltham, and while there invented the patent barrel in February, 1857. Although called a patent barrel it could not be patented, as the idea of a stationary barrel was not a new one. The patent covered the main wheel and use of a retaining power in connection with it. The combination, however, reflects great credit upon Mr. Reed as an inventor. The first of these barrels were screwed to the pillar plate, but this was soon dropped and the mainspring wound directly into the cavity in the plate. It is so well known to the trade in general that a further description in this connection is unnecessary. Messrs. E. Howard & Co. gave him a royalty of one dollar on each movement for the use of it.

Of the watches Mr. Howard desired to produce, it might be well in this connection to say that it was his idea when returning to Roxbury that the firm of which he was the head should make nothing but watches of superior quality, and in this his ambition has certainly been gratified. From this start in Roxbury until the organization of the Howard Clock and Watch Company in 1861, the firm ran on in a quiet way, their aim being to produce really fine watches. However, it must not be supposed that they were free from the effect of the precarious times which was affecting all kind of business, but the firm was pushing the clock business vigorously, and even if the watch business did not at all times pay a large dividend, they could by this means weather the storm. In the spring of 1861 the outlook was very dark and the firm needed more capital to keep the factory running. The best way they knew of was to organize a stock company as preliminary to getting more capital interested. This was done on the 24th of March of that year under the general laws of Massachusetts.

The capital was placed at \$120,000. The name was the Howard Clock and Watch Co., and was composed of Messrs. Edward, Albert, Henry W. and W. Howard, and Geo. Kingman. Mr. Albert Howard was elected President, Mr. E. Howard Treasurer and Superintendent, and Jas. W. Oliphant was made Clerk. The Directors were Messrs. Edward, Albert, Henry W. and W. Howard. But at the next election Messrs. W. S. Eaton, Solomon Piper and Geo. Kingman were elected Directors. The two first-named having come into the company as stockholders after its organization, and the other members of the company desired them to have a voice in the management. The company still found themselves short, financially. A stock of some seventeen thousand dollars' worth of completed movements was on hand that were selling very slowly. It was not

considered best to stop the works, so \$5,000 was borrowed first and subsequently \$5,000 more obtained on the finished stock. The By-Laws were also amended and new officers and directors were elected as follows: Geo. P. Tew, President, in Place of Mr. Albert Howard. Directors, Messrs. Geo. P. Tew, Geo. Kingman, Edward and Albert Howard. The factory ran along under this management about the same as under the old until May 6, 1863, when the directors said it would be best to close the factory. Ten thousand dollars had been borrowed; they thought it would not be best to borrow any more as times were then. They argued if the amount realized from the sales would not cover the actual expense of running the factory it had better be closed, and the assets of the company be disposed of, the debts paid and the proceeds divided, if there were any left. With this end in view the Treasurer was instructed to dispose of the assets of the company to the best advantage, subject, of course, to the approval of the directors.

They allowed him to sell either at public or private sale, but he did not succeed in disposing of the property. In fact, it does not appear that he made any great effort in that direction. A better fate than this was in store for the watch factory, as in August following the subject of a new company began to be agitated and resulted in the formation of a new corporation October 2, 1863, called The Howard Watch and Clock Company. In the formation of the new company it was thought best to have the name as near as possible like the old one, so the words "clock and watch" were simply transposed.

The capital of the new company remained the same. It was composed mostly of members of the old. Mr. E. Howard was elected President, Mr. Albert Howard, Treasurer, and R. S. Lakin, Clerk. The name E. Howard & Co. was engraved on the watch movements and the dials of the clocks as a trade mark, the same as before the change in the management.

Thus far but little has been said about the watches produced except the first. After about twelve hundred of the seven pillar movements had been made, the firm thought the design of the movements could be improved upon, and set about modeling a three-quarter plate movement; this was soon completed and the first of this style was put on the market in 1860.

They had Mershon's patent regulator which at that time was considered a valuable acquisition. The balances for these watches were made in the factory, Mr. George Potter having charge of the work; they were a good balance for that time. In the first three-quarter plate movements the balances ran over the center the same as in the seven-pillar watches, but they were soon changed to run under the center; this made it assume the appearance that it retained for many years, or, in fact, until it was superseded by the new model movement with steel mainspring barrels. This movement was 18 size the same as the others, but it was in connection with this movement that the plan of distinguishing the sizes by letters originated with Mr. Howard, which is now used on all the sizes.

He concluded to call "A" one inch; from that the size advanced one-sixteenth of an inch for each successive letter of the alphabet, which makes an "N" or 18 size movement one and fourteen-sixteenths of an inch in diameter, or the "L" one and twelve-sixteenths of an inch approximately. This three-quarter plate movement proved very popular in the trade for a fine watch; they performed universally well, and would undoubtedly have been continued by the company to the present time as one of their standard movements, had not the demand for a stem-winding movement changed the order of things. The company found they could not make the Reed barrel successfully with a stem winding attachment, as the arbor wound to the left and turned to the right as the watch ran down, and a stem winding attachment to meet the requirements would necessarily be complicated. At the same time the barrel in the Howard watch had become a special feature of it, and Mr. Howard desired it should remain so as far as possible. As there is nothing requiring special note with reference to the business affairs of the company for the

next few years after the date last mentioned in that connection, a description of the new movements gotten out will be next given, first mentioning some matters preliminary to it.

Since Mr. Reed had been in Roxbury with the firm and company who succeeded them, he had acted in the capacity of foreman or assistant superintendent to Mr. Howard. But in 1865 he severed his connection with the company to go to England, and Mr. J. A. Dawson succeeded him. Mr. Dawson did considerable in the line of adjusting while he was with the company. He was succeeded by Mr. F. A. Jones, who afterwards became somewhat of a celebrity in connection with the International Watch Company, of Chaux-de-Fonds, Switzerland, who tried to make watches with machinery built in America. When Mr. Jones retired in 1868, Mr. J. H. Gerry came from Springfield, Mass., to take the superintendency of the company; he had formerly been superintendent of the Springfield Watch Company. Previous to coming to Boston Mr. Gerry had invented a stem winding attachment which, with some modifications, was used in connection with Mr. Howard's patent steel mainspring barrel. This barrel, which winds from its outer circumference, was patented by him February 4, 1868. A somewhat similar device was patented the same year by Mr. E. B. Horn, a watchmaker, of Washington street, Boston. He died shortly afterwards and Mrs. Horn sold the patent to Mr. Howard, thereby enabling him to cover every possible point in connection with mainspring barrel winding as this one does. There was another great advantage to the company in using this barrel, from the fact that it could be made either stem or key winding with equal facility. So the company, not wishing to make two kinds or models of movements, concluded to drop the "Reed barrel movement" after they had the others well under way. This was done in 1871, when some thirty-six thousand of them had been produced. The first movements with the patent steel winding barrel was put on the market in September, 1869, and were key wind. The company had decided to make a sixteen or "L" size as well as eighteen size, and the movements just alluded to were of this size, which was made with the new barrel before the eighteen size.

The peculiar feature about this was that they had what is known as a resilient escapement, viz., the pallet jewels banking against a shoulder on the back side of the scape wheel teeth and thus doing away with the necessity for banking pins. Some eight hundred were made in all, but they proved very unsatisfactory to the New York agents, and were nearly all returned to the factory to have the "resilient" replaced by escapements of the usual form which were similar in both the old and new models. The shape of the top plate in these movements was also patented. The balances in this new model were both smaller and lighter than in the old model and had a less number of screws. The balance screws in the old model were first made with countersinks, the reason being that the poise would be easier arrived at and the resistance to air would be less.

Mr. Gerry, however, concluded to add a slot in the screw heads, and soon after this he dispensed entirely with the countersink, so that at the time the new model was adopted the company were using the regular style of slotted balance screws. Some innovations in the matter of hair spring collets were also made in the new movements. A steel slab collet was used; this was afterwards changed to a small brass collet of the usual form, and later to a brass slab collet which is still in use on all adjusted grades. The idea of the slab collet is that the inner points of suspension of the hair spring is nearer the center of oscillation of the balance than it would be in the usual style of collet. The slab is flat and cut open at one end, which makes it spring tight on the balance staff. Soon after the new model was under way the company commenced using the patent micrometer regulator which Mr. Reed had patented in 1870. An infringement was claimed by Mr. Chas. Fassolt, of Albany, N. Y., who had previously patented one the same in principle, somewhat similar in construction, but operating differently on the hair spring. It will be spoken of in connection with "The Fassolt Watch." The suit was

settled by Mr. Howard paying Mr. Fassolt one thousand dollars and purchasing of Mr. Reed the right to use the patent regulator. It is still in use by the company and needs no description. It is without doubt one of the best patent regulators ever invented, its strong point being the absolute certainty which the regulator is moved a very slight distance. A new way of getting the friction necessary on the center square was also adopted, it being a three-cornered steel washer which formed a spring between the dirt cup and the shoulder of the center square. After the company had gotten out the key winding steel barrel movements, in both sixteen and eighteen sizes, and had them introduced on the market, they turned their attention to making them with the stem winding attachment which has been mentioned. The first were of the "L" size and were ready for sale in 1871.

These movements all had straight line escapements like the old model. Thus far in the history no mention has been made of the manner in which the goods were sold. Messrs. Lewis S. Fellows & Schell, 23 Maiden Lane, New York, were the first selling agents for the Boston Watch Co., but subsequently Messrs. Chas. E. Hale & Co., the predecessors of the present firm of Wheeler, Parsons & Hayes, handled the goods quite extensively. In 1863, when the second company was organized, a syndicate of New York houses was also formed. It was composed of five firms, as follows: Messrs. Fellows & Co., Cooper, Fellows & Co., Middleton Bros., Warren & Spadone, and Wheeler, Parsons & Co., each of the above firms agreeing to advance the company \$5,000 in cash or \$25,000 in all as a syndicate, and control the sale of the entire production. This plan was carried on a number of years, but the company concluded in 1870 to have its own agent and store in New York. Mr. J. W. J. Pierson took the agency and since represented the interest of the company in New York, having an office first at 15 Maiden Lane. He subsequently moved to a store at 552 Broadway for the purpose of doing a retail business for the company. Other changes were also made previous to 1886, when their present office at 41 Maiden Lane, which is now occupied by the E. Howard Watch and Clock Co., was rented. The Boston store, now at 378 Washington street, was opened in 1860. It has always been under the immediate supervision of Mr. Albert Howard.

The ladies or "G" size watches were produced in 1872. It was at that time the smallest American watch made. In 1877 the company made some changes in the matter of escapements; that which they had been using was a mongrel; it was between a circular and equidistant locking and was not in all respects satisfactory. Mr. J. W. Learned, the present superintendent, succeeded Mr. Gerry in March, 1877, and soon after assuming the duties of the position he remodeled the escapement. He was assisted in this work by Mr. J. W. Bell, the inspector, who is an expert in the matter of escapements. The feature of the escapement was the rounding of the escape wheel tooth from top to bottom, and making the impulse face of the pallet stone perfectly straight instead of the usual manner of reducing friction, which is to round the pallet stone; the banking screws were also dispensed with in this escapement and the fork is banked against the pallet bridge. The company now began to pay more attention to adjustments than they had ever done before, although from the time the new model movements were first made they paid considerable attention to this branch of the work. They had commenced making fine tempered hair springs as early as 1865 as the result of experiments by Mr. E. Howard, Mr. Edward Todd and Mr. John Logan, now of Waltham; the two last named having done much to bring this about while they were in the employ of the company previous to the above date. This left but little to be desired in the matter of hair springs.

Nickel movements were gotten out in the spring of 1871, the first being "N" or eighteen size. The plan adopted on nickel movements was to make them of a medium grade of nickel which worked much easier than a fine grade would. After the plate was damaskeened they were flushed or plated with pure nickel, which made a most

indestructible finish; that plan, however, was afterward dropped and a fine quality of nickel adopted.

(To be continued)

The Jewelers' Security Alliance.

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First Vice-President, AUGUSTUS K. SLOAN.....Of Carter, Sloan & Co.

Second Vice-President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.

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CHAS. F. WOOD.....Of Chas. F. Wood.

Counsel, HON. ALGERNON S. SULLIVAN.

For further information, Application Blanks for Membership, By-Laws, etc., Address
P. O. Box 3277. 170 Broadway, New York.

The regular meeting of the Executive Committee was held at the Alliance office on Nov. 12. There were present President Dodd, Vice-President Sloan, Treasurer Kimball, and Messrs. J. B. Bowden, Chairman, N. H. White, C. G. Lewis and Secretary Champenois.

At the above, and at a preceding special meeting, the following applicants were admitted to membership, viz.:

Gluck & Black, Birmingham, Ala.; J. H. Emerson, San Antonio, Texas; W. N. Gregory, Nanticoke, Penn.; Chas. F. Billan, Cedar Rapids, Iowa; F. H. Coffin, Peterborough, N. H.; J. R. Elliot, Minneapolis, Minn.; Foltz & Frank, Akron, Ohio; L. Gauchat, Clarksville, Tenn.; Jiroh Kinney, Buffalo, N. Y.; J. M. Bonnet, Zanesville, Ohio; B. Garrettson, Kenton, Ohio; A. R. Stewart, Bradford, Penn.; Winter & Lueck, Minneapolis, Minn.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular :

Chicago jobbers are entering on the holiday trade in at least a hopeful, if not a jubilant spirit, and with the settled expectation of big business. Although the first two weeks of November were rather dull, scarcely a jobber could be found but would allow that trade was fair enough for the time of year. Where the shoe pinches is that most jobbers, remembering the unprecedented rush of business last December, have bought freely in anticipation of a similar rush, and sales so far have not come up to their expectations. It should be remembered in this connection that it was well on in December last year when the great rush of business came, and a good many jobbers were hardly prepared for it. In nearly every staple line there has been a perceptible falling off in the volume of wholesale business during the last three or four weeks, but that may be largely accounted for by the fact that the stocks of winter goods have all been laid in by the country trade. The ebb and flows in the jewelry trade vary considerably from the fluctuations in other lines of business, and a careful look over the present situation entirely justifies the belief that the holiday trade will be fully up to what has been expected for some time. The prices, for produce, it is true, are ruling rather lower than was generally expected, and this may occasion a slight scarcity of money among country buyers, but there is not seriously much to be dreaded in this direction by either the jobbers or dealers in jewelry. People will buy at all hazards for Christmas, and the country

dealer must be prepared. Money, though still a trifle tight, is no more so than it was six weeks ago. Collections, generally speaking, are hardly so good as three or four weeks ago, but there is every indication that December will make up for the disappointment occasioned by the slight depression in November. Taking things altogether every jobber who has made a close comparison of this year's business, week by week, with that of last year, finds abundant cause for satisfaction in a very substantial increase.

Benj. Allen, one of the most conservative men in the trade, is free to admit that his business during September and October was at least 10 per cent. ahead of last year, and that, in spite of the check which his business received during July and August from his change of business and building operations, his average for the year will be considerably ahead of 1885. His business for November has been exceptionally good, running far ahead of the same month last year. Mr. Allen anticipates a good holiday trade, and is finding collections much easier than they were two months ago. His travelers give, in the main, encouraging reports. East of Chicago they have done better business than last year, and in the West, Northwest and Southwest, things are at least up to, or a little ahead of, last year's showing. In Dakota alone is business reported dull, and this must be conceded as being largely to the extortionate rates of transportation. Mr. Alister, of B. F. Norris, Alister & Co., finds the volume of business at least one-third more than last year, and reports collections as good. He looks for an immense holiday trade, but declares that if it comes heavier than last year he will hardly know how to take care of it. He is prepared, however, with a larger stock and a larger staff of employees to take hold of all the business that may come his way.

Stein & Ellbogen are much encouraged with their venture as diamond merchants. It will be remembered that Mr. Ellbogen bought a considerable stock of diamonds at Amsterdam a few months ago. The firm has found a good market for its brilliants, and will for the future make diamonds a special branch of the business. Mr. Stein says that he has had better sales and better collections than he could ever have anticipated, and feels pretty confident of a brisk holiday trade. Clapp & Davies are having a steady, healthy run of business, and will come out decidedly ahead of last year.

M. C. Eppenstein is getting a satisfactory share of the business that is going. He is now carrying one of the finest lines of Swiss watches in the city, and is energetically reaching out for new trade. The Holmes & Edwards Silver Co., and the Hartford Silver Plate Co. are showing elegant stocks in their respective lines.

Our old townsman, J. Quincy Walker, so well known in the clock business, is about to open a salesroom and agency for the Self-Winding Clock Co., at No. 38 East Madison street.

Messrs. W. S. & J. B. Wilkinson, the sons of "Uncle" Wilkinson, Superintendent of the Gorham Manufacturing Co., are doing a successful manufacturing business, at No. 51 Wabash avenue. The members of the promising young firm are now bringing before the trade one of the finest lines of jewelers' trays and plush and velvet cases, etc., ever manufactured. They have just issued their first catalogue.

The Waterbury and New Haven Clock Companies are doing a rushing business, being kept so busy that they can barely overtake their orders.

Considerable surprise, and no little regret, was created in the trade by the assignment of Samuel Swartchild, who has been looked upon as one of the most pushing and rising young men in the trade. It is safe to say that Mr. Swartchild's business troubles would never have occurred but for the unfortunate illness, which has confined him to his home for several months. His affairs are now in the hands of a receiver named Samuel Glickauf. Mr. Swartchild's liabilities will, it is thought, amount to \$50,000 or \$60,000. Of this there are \$21,000 of preferred claims. The assets are estimated at \$35,000 and upwards. Some claim that Mr.

Swartchild is perfectly solvent, and his honesty and integrity are not questioned. His entire capital is in his stock. Mr. Swartchild, who suffered a slight relapse a week or two ago, is now steadily improving, and will soon be on his feet again.

David May, the embezzling clerk of Otto Young & Co., was sentenced to one year in the penitentiary. Judge Gary intended to make the sentence three years, but the prisoner's pleading secured the two years' reduction. A. A. Roeser, the youth who had entered into such a subtle scheme to plunder Benj. Allen, lies in the county jail, being unable to find the \$250 bonds under which he was placed.

S. J. Newell, one of the clerks in Benj. Allen's store, was a passenger on the much delayed *Anchoria*. He was visiting his friends in the old country, and took twenty-eight days to cross from Glasgow, Scotland, to the New World.

Two men named Howard and Rieger have been arrested and identified as the participators in various jewelry robberies where red pepper was thrown in the eyes of the salesman.

Retail trade in the city is rather dull. The dealers do not, as they say, "catch on." The stock yards strike has no doubt contributed somewhat to this through the uncertainty it has created, but Christmas is coming, and the retailers will soon forget the present slight depression.

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

APPEARANCES already indicate the approach of the holidays, though this number of THE CIRCULAR will have been scattered through the width and breadth of the land before what are known as "Christmas novelties" are fairly in the show cases. Each year our dealers delay the exhibition of their specialties until the last moment. Just why this is done nobody seems to understand, various reasons being assigned. Chief among these is the fear that others will "borrow" their ideas, or that the goods will seem old to patrons who, as Christmas tide draws near, more than at any other time, are on the alert for something entirely new. While, however, the great majority of holiday shoppers are not yet at work, the conservative class are taking time by the forelock and quietly and comfortably selecting their gifts before the rush begins. These early holiday shoppers, along with the regular trade, have largely increased the late autumn and winter sales.

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THE increased sales of jewelry and silverware are by no means confined to the legitimate trade. The bazaar men, too, are doing an increased business and carrying extended lines of the more popular and staple articles. As THE CIRCULAR has repeatedly told its readers, there is only one course to pursue, and that is to meet this outside competition on the enemy's own ground. Long ago leading retail dealers in the cities realized the necessity of diversifying their stocks with goods outside of jewelry and silverware, salable goods that not only enhance the attractive appearance of their windows and show cases, but entice many customers to their shops who otherwise might not enter. There is nothing more fascinating to the average shopper, and especially women, than the assurance that there is a wide field for selection, and herein lies the secret of success in all the fancy stores. This is especially true during the holiday season, when would-be patrons are not at all certain what they want, but search after novelties in places that exhibit a varied and extended collection.

MANY leading New York houses are now carrying big lines of the finer grades of art pottery, porcelains and bronzes. The Carlsbad ware, with its jeweled and rococo effects, affords charming vases and other pieces. Royal Worcester supplies an immense assortment in pleasing shapes; royal Dresden china gives both useful and ornamental articles; while figures, groups, busts, etc., come in bisque and terra cotta. The Carlsbad ivory ware is not only attractive but reasonable in cost, while Leed's faience is both popular and cheap. The cameo glass vases, odor bottles and other decorative pieces continue popular. Artistic glass ware, suitable for vases, water sets, shades and globes, comes in ivory and gold, ivory and crystal, pearl, opalescent and other colors. Very attractive is the French china decorated ware, including gift cups and saucers, tete-a-tete sets, fruit plates, jardinieres and similar practical articles. Among recent novelties in pottery is the "Gobelin," which resembles in its decorations and colorings the tapestry from which it takes its name.

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AN ARTISTIC novelty in pottery of recent introduction is the "aventurine" ware, which resembles transparent quartz sparkling with scales of mica, to which are applied harmonious colors in way of lacquer and decorative work. In many of the specimens of this ware designs in relief are illusively produced. Very beautiful effects have been gained by an association of bronze or brass and aventurine ware, as, for example, mantel vases of aventurine with bronze handles and base; or, brass lamps with aventurine bowls. This new ware, both with and without metal trimmings, is out for the holiday trade in an infinite variety of vases, pitchers, urns, lamps and jardinieres. Extension lamps, with brass standards and aventurine bowls in rich and brilliant coloring, are exceedingly attractive, as are also the jardinieres made in this ware.

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THE better class of trade in every locality is more or less fastidious in the matter of stationery, and prefers to buy note and letter paper, visiting cards and cards of invitation, where correct styles, and correct styles only, are kept in stock. Fine stationery, therefore, affords an admirable opportunity to the jeweler, who, as a rule, prides himself on the excellent quality of his articles. For the benefit of retail dealers who handle stationery the following items are given: Let fancy papers and envelopes go to the bazaars; these are never fashionable with the fine trade. The only colors admissible in letter and note paper for people in polite society are white, cream and a delicate shade of gray. The paper may show a smooth or rough surface, as best suits the buyer. Sheets are folded once to fit into the square envelope used, and the letter may be sealed with wax or not as pleases the fancy of the writer. In place of cards this season has been introduced small sheets of paper to fold once and go into square envelopes of small size.

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VISITING cards ought to be of the best quality of Bristol board, with the name engraved in the center. The present tendency in cards, for ladies' use, is to those square in shape, and the cards run large in size. The largest card of all is used for "Mr. and Mrs.;" the next (a trifle smaller) for "Mrs.;" and the next (yet a little smaller) for "Miss." Elderly men use visiting cards of medium size, but young men employ very small cards.

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FOR some reason, not apparent, the silver card case is no longer

popular. In its place are carried cases of fine leather, beautifully decorated with gold or silver trimmings in way of corners, center pieces, monograms or initials. Some of the newer card cases show fine, but highly colored enameled mountings; others are made of Japanese decorated leather, ornamented with gold bronze trimmings.

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AMONG staple articles that take on tremendous impetus as the holiday season advances are clocks, and for this season the dealers carry, as a rule, an unusual variety of styles. Among clocks likely to attract attention now are the self-winding ones of recent invention. These clocks are automatic, winding at regular intervals by electricity, a battery being placed on the top of each case. An attractive clock out for the holiday trade, standing about a foot and a half high, represents an old oaken bucket in an old-fashioned well. In the curb of the well appears the dial and works, over which swings the bucket, as a pendulum, from the roof that covers the whole. Very pretty are mantel clocks covered with plush, and having on one side a niche in which to place a Dresden china or bisque figure. Cabinet clocks, in handsome hard wood cases, are out in new and pleasing patterns, and appear to sell as well as ever, though the marble clocks, with both French and American works, are popular. For those who can not afford these come imitation marble cases, fine polished wood cases, nickel and other materials.

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PLACQUE clocks appear to retain their hold on the public. Some handsome ones seen were of blue china set in silk plush. Novelties in timepieces gotten out for a popular trade show some queer conceits, among which may be mentioned a clock in the shape of a sunflower with a dial in the center. The old horseshoe design still does its perfect work in metal, bronze or plush, the clock resting in the curve of the shoe. A barrel in polished hard wood, with nickel hoops, plays the part of a clock, the face of which appears in the center of the barrel. Owls and dogs of bronze indicate the time of day on dials placed on the breast. In nickel clocks the variety is endless. A favorite with some comes in the shape of an open-cased watch of old time bulbous form; these clocks contain watch movements and have a second hand. Nickel clocks in rustic patterns and oxidized effects are attractive in appearance. Then there are clocks in brass and nickel cases that represent little Swiss chalets or Yankee cabins.

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WATCHES are such clearly necessary and always salable articles, that it is not to be wondered at that there are continual improvements in their mechanism, and endless variety in the design and finish of their cases. While watches continue to be made with both single and double cases, many watches have the half or single case, to show the decorated dial and jeweled hands. Ladies' watches, which run just now to small sizes, are much made with open face, and the tendency is decidedly to decorated cases, although plain ones are still in fashion. A fine watch made to order for a gentleman and seen recently, was in Louis XIV. design with a gold dial and blue enameled figures, the single case being of beaten gold. In silver watches for both men and women are to be seen some beautiful effects in etching, chasing and fine enamel work. Many of these watches show oval faces of silver with enameled numerals and jeweled hands. Others present blue enameled faces with silver numerals and hands. For jeweled watches there is considerable demand, and,

in these, the gems are frequently used in association with enamel or raised wire work.

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IN SILVERWARE, both sterling and plated, the holiday exhibit affords some rare specimens of *repoussé*, chasing and etching. In these occur many old English forms and styles of decoration. Of course, dinner sets and ordinary table ware give place for the time being to odd pieces and small sets suitable to Christmas gifts. Low pitchers in the fluted pattern of Louis XV's time, punch bowls in *repoussé* and Moorish finish, fruit dishes of richly colored glass set low in silver wicker baskets, all invite purchasers of holiday goods. The same may be said for bonbon dishes of twisted and braided silver wire in basket patterns, Turkish or after-dinner coffee sets, ale mugs, loving cups and the like in new patterns. In the new silverware the *repoussé* in white finish is a leading style, although etching and oxidizing appears. The fluted pattern in bright finish that runs diagonally, is a popular one in both sterling and plated ware and bids fair to have a long run. The many new patterns in small casters are attracting attention at this season, as are open salt cellars in unique designs to take the place of shakers.

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MOST popular of all, however, for the holiday trade are articles of silver for the toilet. Manicure sets, always in more or less demand, afford a wide range in price as well as selection, and show all the styles of decoration and finish seen in other silver goods. Liquor flasks in silver cases decorated in old English chasing, and match safes and decorated meerschaum pipes add to a long list of articles specially adapted to the wants of men. A new thing in flasks is one in which a collapsion cup screws on to the top when not in use. In the matter of shoe and glove buttoners, shoe lifts, match boxes and cigarette cases, the silversmith has exhausted every conceivable design that could be worked in metal. The enameled watch boxes are some of them very beautiful; then there are gold and oxidized silver cases open at the side for the introduction of the paper boxes of wax matches. In cigarette holders there is also a large assortment; some are half amber and half frosted silver. An elegant specimen seen had a band of small diamonds between the amber and the meerschaum.

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QUITE new are the shaded colored glass scent bottles, with gold or silver tops, of English production. Book marks in gold, tortoise shell and silver, always acceptable gifts, are made especially attractive this year by the introduction of gems on the handle. Very pretty gold ones seen, which afforded both a book mark and paper knife, had the handle richly chased, with silken cord and tassels attached. Quite new in cigarette cases to place on the table are round boxes of silver elaborately carved or etched. Very pretty amulets to wear on the watch chain come in circular form and are known as the Kismet. These are incased either in gold or silver and emit a delicate fragrance which is lasting. These Kismet amulets are of Russian origin. This is as good a place as any to tell that charms of all kinds are being much worn on watch chains by both sexes, the seal being popular with men.

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THE fairy lamps and fairy lights, with their vari-colored shades and globes, are meeting with approbation, and will doubtless prove popu-

lar holiday articles. Quite new in this same direction are what are termed "tulip lights." These consist of small tulip-shaped shades so constructed that when placed over the flame of a candle, in either silver candlestick or candelabra, they will drop as the candle burns, and thus retain their place over the flame until it is burned out. The effect of these tulip lights or shades on a candelabra of several branches is decidedly decorative. This is as good a place as any to tell that single candlesticks of silver, especially those in antique pattern, are much used. Decorative lamps are also in demand, and include all styles in both table and extension lamps. Many of the new lamps, by the way, are furnished with the Rochester burner.

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DIAMONDS are par excellence the most popular of gems, and the finer stones are in large demand at remunerative prices, as are, in truth, fine specimens of every gem. Indeed, now that color is sought as well as brilliancy, choice colors in stones not always prized are at present in demand; a notable instance is the garnet, ordinary specimens of which are usually delegated to children's jewelry or for setting in rolled gold plate. The garnet gives some examples of beautiful colors which can not be gained elsewhere, and it is these that are highly prized. The same remarks hold true of the amethyst and other stones, the majority of which are neither high priced or rare. Rubies were never in greater demand nor commanded higher prices than now. Pearls, too, are finding an active market, especially perfect shaped ones and those showing well defined colors. Spinel in choice colors are desirable, and it goes without the saying that beryls of rich color and fine luster are in demand.

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WITH the increased demand for opals has appeared in the market naturally a great variety of opals, some exceedingly beautiful, rare and valuable, and many of almost no intrinsic value whatever. The Hungarian opals are the most highly prized gems, and a fact not generally known in this connection is that the miners are under the control of the government, and are worked only to meet the demand. In a word, the opals are never given out in excessive quantities; if the market be dull, the mines are worked but little, if at all; if active, the work is resumed. This explains, in part, at least, why the price of rare Hungarian opals is always sustained to an amount commensurate with their real worth.

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THE value of the opal depends on the brilliancy and play of its colors. Without the various colored fire, in flakes or flashes, the opal becomes an insignificant and worthless thing, just as on the other hand, when this fire is shown in large flashes, the gem is beautiful and desirable. Fine opals of large size seldom occur, and are, therefore, entitled to fancy prices along with other rare gems. Two or three of these have been seen within the past month in an importer's collection, but before the holidays are over will have been mounted in pendant or brooch with a blazing circlet of diamonds around them. Among curious specimens noted recently was an opal so dark in color that it was called a "black opal;" like other fine specimens this was brilliant with fire and ever-changing hues.

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THE moonstone holds its own with strong tenacity, and will prove a first rate selling article during the holiday trade. These stones are set both in gold and silver, the latter being the newer of the two and

perhaps the most popular. The finer specimens of Ceylon moonstones, those in which the *chatoyant* reflection is most marked, are set in rings, fine brooches or studs, with and without small diamonds. The larger stones are much set in clasps for ladies' garters, while medium sized stones are used in necklaces.

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SCOTCH pebble jewelry is in the show cases of the up-town retail stores in new and pleasing patterns. This being essentially a jewelry suited to winter fabrics, it is having at the present time increased sales. One sees these Scotch pebbles set in a variety of ways, the most attractive being, perhaps, that in which the stones are set in silver flush with the surface.

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THERE is the widest possible latitude taken nowadays in the setting of gems, the only restriction apparent being that little or no gold shows when the gems are large and fine. Solitaires continue to be mounted in very unobtrusive settings; indeed, when placed in ear rings, the setting often does not show at all. Smaller stones are set sometimes in an open or net work of gold, as in a filigree ball ear ring or gold wheel brooch; sometimes the smaller stones are imbedded in chased or nugget finished gold, and often they are set in clusters or as a border to a large gem or miniature painting. Cluster finger rings and ear rings are of frequent occurrence; sometimes the clusters are large and sometimes small; occasionally there are, in finger rings, two small clusters, one on each end of an overlapping shank. Small gems continue to be employed in both insect and flower pins, with and without colored enamel.

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JEWELED aigrettes are counted with winter novelties, and there is no end to the gold and silver hair pins with jeweled tops. The little scarf and bonnet pins that have been so sedulously patronized by the ladies for the past twelvemonth appear to be as fashionable as ever, and these employ in their decoration tiny diamonds, sapphires, rubies, moonstones and garnets. These little pins come in every pattern the fertile brain of designers can copy or originate; there are spiders, lady birds, a swallow, a tiny pansy, a chrysanthemum, an owl, a beetle, a spoon, a key, a basket filled with diamonds, and other conceits too numerous to mention. These little fantasies form pretty and always acceptable gifts, and, being in no case of excessive value, are among the jewelers' best selling articles at the present time.

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THE *fleur-de-lis* is a popular design in fine jewelry. One sees it copied in gem-set pendants, brooches and hair ornaments, and in gold and silver brooches. A beautiful silver brooch seen in *fleur-de-lis* pattern showed the niello finish with applied gold decorations. In silver brooches and cuff buttons are to be seen many valuable antique coins, as well as admirable copies of these and other antiques in niello finish. Some of the newer flower pins copy the chrysanthemum in one of its many varieties. The new chrysanthemum introduced with such a grand flourish and the taking of premiums at the late chrysanthemum show as "Mrs. Grover Cleveland," has not as yet been remodeled in precious metals, but doubtless will appear before the year is quite spent to swell the list of floral brooches.

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THE Limoges enamels and miniature paintings previously described

as being mounted for brooches and pendants in fine gold settings and surrounded by brilliants or pearls, have appeared for the holiday trade in silver settings. This silver jewelry comes in form, not only of brooches and bar pins, but sleeve buttons. In the Limoges enamels a variety of subjects are represented, while the miniature paintings, which appear under glass, are copies mostly of celebrated portraits of women by Lely, Gainsborough and other painters of court beauties. The designs in the new silver settings are, many of them, antique in character and show the niello finish.

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IN GOLD scarf pins there is quite a fancy for bird pins; pins that simulate in colored enamels the variegated plumage of parrots, swallows and ladybirds. Decided novelties in silver, in niello finish, are tiny heads of animals, as a dog or horse, so faithfully wrought in every detail as to reproduce, even in the smallest examples, the expression of the animal's face. These silver pins, also silver cuff buttons and silver rings in antique patterns, are affected mostly by young men who incline to English styles.

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SCARF pins for men, by the way, appear to sell just as well as ever, although the demand has largely increased for studs. This is explained by the fact that while all shirts are now made for three studs, whether for day or evening wear, the scarfs worn with street suits cover the studs, and admit, therefore, of a scarf pin in one corner when this is desired. With the dress suit all is different. The white muslin tie being the only correct neckwear, the studs become the ornaments. As with most other jewelry, so with shirt studs, there is a wide field for selection. Many still patronize for evening wear the white enameled buttons, others wear moonstones and others diamonds. Plain gold studs are much worn and there are pearl buttons mounted on gold.

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THE Queen continues to lead in watch chains for ladies' wear, but a new style is shortly to be introduced by a well known manufacturing firm that will furnish a change to the present popular fashion. The new chain is quite short, with a swivel for the watch at one end and a small pin at the other with which to fasten it to the corsage; while from this pin hangs a chain of equal length with the main one on which to wear charms. The originators of this new chain have not yet christened the new-comer, but as they named the popular Queen, little fear is entertained but that good taste will be exercised in the matter.

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BRACELETS were never more worn than at the present time, all styles and kinds being admissible. The present fashion still calls for gem necklaces, while pendants set with gems are in as great demand as ever, and are fashionably worn on a slight gold neck chain. Some very pretty silver necklaces enameled and set with small gems in rococo effect represent Persian contributions in this direction in addition to being exceedingly attractive.

* * * * *

BLACKENED silver, set with brilliants, for mourning jewelry, and silver oxidized to represent iron, set with gems, for half mourning,

are Parisian fancies that are finding favor here. The niello finish is a popular one on silver jewelry; indeed the tendency is to a dull dark finish in much of the silver work, notably that which copies antique designs. A beautiful surface seen on some of the new silver jewelry is produced by exceedingly fine chasing, and resembles somewhat the best specimens of satin finish. Some bow-knot pins seen afforded pleasing examples of this fine chasing, in which the very sheen or glimmer of silk ribbon was simulated.

*

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NUMBERED with beautiful examples of silver jewelry of white finish are broad bars and oblong pins with finely chased surfaces on which appear exquisite enamel paintings of birds, flowers and insects. The workmanship on these pins, both as regards the finish of the silver and the enamel work, is simply perfect, and lifts silver jewelry to a decidedly elevated plane among personal adornments of artistic merit.

ELSIE BEE.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

MORE ABOUT COMMERCIAL TRAVELERS.

To the Editor of the Jewelers' Circular:

Having been a traveler on the road for many years I can sympathize with the complaint of "G. R. T." in your November issue. Unfortunately, there are a few men in our line of business who are continually bringing discredit not only upon the majority of travelers, who are gentlemen, but also upon their employers. They are fitly described as "cheap and nasty," fairly fulfilling every requirement entitling them to be ranked in both categories. Cheap they are or they would not be on the road; nasty they are both in their person and conversation. Occasionally one of these discreditable persons forces his way into the society of respectable and self-respecting travelers while on the road, but as soon as his true character is ascertained, he is sent to Coventry, the others declining to associate with him lest they be taken for guns of the same caliber. I often wonder at the good nature of dealers who permit themselves to be worried, if not bulldozed, by these fellows, and when I have expressed surprise at their toleration, they respond that they do not like to offend them for the sake of their employers. But it seems to me that the character of the employer is indicated somewhat by the kind of men he sends out to represent him, and there is little occasion for forbearance. I find that this class of cheap men not only hurt the respectable travelers in the estimation of dealers, but also at the hotels, where they put on so many airs, and with railroad men. Travelers often require little courtesies from railroad employees, but these cheap travelers, with their arrogant and offensive manners, tend to bring us all into discredit and cause those who would otherwise be our friends to treat us in a curt and crusty manner. Employers ought to understand that cheap labor is always the most costly in the end, and a traveler at ten dollars a week may cost more in loss of trade and friends than is saved in his salary. I have seen travelers on the road this year who were not yet of age, who had no experience with men or knowledge of them, and whose sole claim to be commercial travelers lay in the fact that some New York house was paying their expenses. Their object did not seem to be to work in the interests of their employers, but to have what they call a good time, travel about, see the points of interest in different places, go to theatres nights, flirt with unsophisticated girls they met, and in general behave like young loafers. These fellows have neither the

experience or manners of business men, and do not command the confidence of the dealers whom they visit. It is short sighted policy at any time to send a boy to do a man's work, but now here is it likely to prove a more costly operation than in putting cheap men on the road as commercial travelers. I secured two good customers this season by happening along just after one of these cheap men in whom the dealer had no confidence. One of them told me that he had so little confidence in one of them that he did not believe in the prices he was naming, but thought the fellow was trying to make a profit for himself on some things he proposed to deliver. I shall do my best to hold these customers in the future, and if my competitor loses them it will be simply because he sent an incompetent traveler on the road this year. Retail dealers are men of good hard sense as a rule, and do not like to do business with persons for whom they can have no respect, and are prone to think that the ones who send out such men are lacking in respect for the retail dealers. Our business is an honorable one, and it is a pity to have it disgraced by striplings.

TRAVELER.

IS MACHINERY A BENEFIT TO LABOR?

To the Editor of the Jewelers' Circular:

I read with much interest an article in the November issue of your magazine, an article headed "Machinery a Benefit to Labor." I have read other articles of the same purport from time to time, the idea conveyed being that the introduction of machinery to do certain kinds of work so cheapened the cost of the product as to create an increased demand for that product, and that while a few men could, with the machinery, do the work of many, yet the increased consumption of the articles manufactured rendered the employment of more men necessary. Let us grant, for the sake of argument, that the introduction of machinery gives employment to more men, it is by no means a logical sequence that machinery is a benefit to labor. I contend that it is the main cause of the scarcity of skilled workmen in almost every line of trade. Instead of having good all-round workmen, we have now little else than specialists, men who have been taught to superintend machinery employed in making some one thing—a part of a watch, for instance—and who know how to do that one thing well, but nothing else. Take away from them the machinery and they would be unable to produce even a sample of their specialty. We have comparatively few watchmakers now for the reason that watches are made by machinery, and hand-made watches are seldom seen in the market. I had some experience in this line myself. I went into a watch factory to learn the trade of watch making, as I supposed. After a short time I was placed in charge of a machine for turning pinions, and there I stuck for months. I learned all about that machine, and became expert in running it, but I never got beyond it. I found men in the factory who had been doing that kind of thing for years without any advancement or hope of any; in fact, they did not desire any—they were satisfied with what they earned, or circumstances compelled them to be content with their lot, and so they worked along, year in and year out, at the same old routine, never advancing one iota in their knowledge of watch making. It was not necessary for me to be that kind of a drudge—part of a machine, in fact—and after a few months, despairing of improving my condition in the factory, I left and found employment with a watch repairer, and there I learned the trade of watch making.

In the jewelry business the same thing is found, and so indeed in almost every other trade—machinery is doing the work of the men, and apprentices have no opportunity to learn trades. For this reason, trained and skilled mechanics are becoming scarce.

In one other phase, machinery is no friend to labor, and that is in the question of wages. As a tender to a machine, a man may get \$2 a day, when, if he were a skilled mechanic, master of his trade, he would be worth twice or thrice as much. Machinery may give employment to a greater number of cheap men, but it does not make workmen, nor does it fairly remunerate those who serve

it. The fact that attending a machine is mechanical work opens that field to cheap and unintelligent labor at the expense of brains and skill. Possibly the fact that it gives employment to so many more persons may compensate in the long run for these drawbacks, but in individual cases machinery cannot but be regarded as an obstacle in the way of their advancement. WORKMAN.

COMPROMISING WITH DEBTORS.

To the Editor of the Jewelers' Circular:

I have recently been the victim of a most outrageous case of compromise that I know of. A competitor of mine failed badly, and after some delay, during which every one of his creditors became fully convinced that the failure was nothing less than robbery, they compromised with him at twenty-five cents on the dollar, taking part in notes that will, I do not doubt, be largely discounted in the end. No sooner was this compromise made than this insolvent came out with flaming advertisements announcing that he had marked down his goods "below cost," and was selling them at great sacrifice. And while the community ordinarily would not believe him under oath, knowing that he had failed, but still had the goods, they flocked to his store and bought his goods freely. As a matter of fact, he did put down prices very low, so completely underselling me that I should not be surprised if I had to fail solely for lack of business. As a result, my fall trade has been destroyed, and I have little to look forward to for the winter. The persons who have thus injured me temporarily, if they have not ruined me entirely, are the creditors of this rogue, who, finding that he had robbed them, fined him a portion of his ill-gotten gains and then left him to go on in business under far more favorable conditions. In short, this dishonest person has a stock of goods that cost him only about twenty-five per cent. of what mine cost me, and, of course, he is making the most of this advantage to destroy me. Yet I am expected to pay these same creditors dollar for dollar for what I owe them. It would serve them right if I were to demand the same discount they allowed him.

I know that it is a difficult problem how to settle with insolvent or dishonest creditors, but some plan can certainly be evolved that will not drag down an innocent party, who had nothing to do with the failure, yet is made to suffer most from it. This man should not have been permitted to continue in business; that the failure was a fraud was evident to every one familiar with the circumstances. While it might have been policy to accept such settlement as he could be persuaded to make, he should not have been permitted to retain the goods he had and immediately begin selling them at reduced prices. I had no special desire to get him out of the way as a competitor so long as he had to buy his goods at market prices, the same as I do; in fact, I do not know of a less dangerous competitor than he, because no one had confidence in him; but when he came into the field with his insolvent stock at less than cost, every one rushed in to buy, in the hope of reaping some profit from his rascality. I do not blame my neighbors—they acted in a very human way, and none of them are angels, but it is none the less hard on me. Now I maintain that every insolvent's stock should be taken out of the market in some way when a compromise is made; or, at least, it should not be permitted to be sold at less than a fair profit on cost price. The creditors of an insolvent can control this if they choose to do so, and unless they do they injure every dealer who has to compete with such stock. I feel that I was just as much robbed by these creditors as I would have been had they taken the money from my safe.

DOLLAR FOR DOLLAR.

A COMMERCIAL TRAVELER REPLIES TO CRITICISM.

To the Editor of the Jewelers' Circular:

In answer to "G. R. T." in your November issue, I am impelled to presume upon your valuable time and space, not only in self

defense "being one of that much abused and objectionable class," but also to raise my feeble voice in behalf of the eighty odd thousand poor devils whom "G. R. T." endeavors in his bilious and splenetic attack to assail as a class.

That "G. R. T." was laboring under baneful influences is apparent, and would suggest to commercial travelers in his locality to petition the proper authorities the propriety of having a distinguished body of physicians make an autopsy of his case. I am inclined to believe it was a case of old English Verge, or more likely water (bury) inside the skull! If not found correct as above, I would suggest to that honorable *ante mortem* inquest, that under a microscopical examination the case may prove a general drying up of the milk of human kindness and a plentitude of Missouri Gumbo in the arteries and skull caused by an aggravated case of six per cent. spot cash ague.

The supposition of "G. R. T." as to the necessities of modern times no doubt will bring to the mind of the afflicted reader the massive contraction of our business methods, when compared with the time when Adam was a boy period. No doubt "G. R. T." might endeavor to refreshen the Biblical knowledge of the knights of soft solder by advancing a thesis to the effect that it was in the Garden of Eden the drummer sold his first bill of goods (apples) to Eve & Co., and thus through a drummer the entire evils of the human race were brought about. When Mr. "G. R. T." says as a class the commercial travelers is objectionable, he takes upon his shoulders too heavy a load for those twin angels to sustain. In no calling is industry, perseverance, sobriety and courtesy so often combined in a person as in the traveling man. He is out in all kinds of weather, up at all hours of the night to ride to his destination to work the next day in selling his merchandise, always laboring for the best interests of his employer and customers. Sometimes ill-luck and poor sales meet his labors, and gloom and strange faces are his consoling reward.

The commercial traveler comes in contact in his business with the deacon of a village church, or the Mayor of a prosperous town as his customers; all the leading men through his territory are either his customers or his friends; in order to successfully maintain his position the traveler must be an educated, cultured person, ready to converse on theology, political economy, or watch crystals, and all understandingly. Now if the commercial traveler does all this (and no one can dispute it) how does Mr. "G. R. T." account for it? If, as he says, commercial travelers as a class are objectionable, does the lion consort with the lamb? and has the honorable "G. R. T." "*Heard the news?*" Once upon a time, as the fable goes, a crafty fox, taking his evening constitutional, passed a matronly hen perched on a limb of a tree and opened upon a conversation.

"Good eve, Miss Hen, it seems to me you are occupying an exalted position to that of your humble neighbors; come down and be sociable," quote the Fox. "No, thank you, sir," said Mrs. Hen. "But I have some good news to whisper to you," said the Fox. "Well, that may be, Mr. Fox; I am regular in my habits, Mr. Fox, and obey the rules laid down by my parents, retire early and don't go out nights," replied the hen. "You haven't heard the news. I am heartily sorry you will not come down and be sociable, and as you wont, I will tell you from here, that peace and plenty has been proclaimed throughout the land, and we are now all brothers and sisters. Mr. Wolf and Mr. Sheep have joined the Salvation Army, and Mrs. Cat and Mr. Rat are now advanced evolutionists," said Mr. Fox.

Just then the house dog spied the fox and made for him with a rush. The fox ran into a hollow log and looking through a hole saw Mrs. Hen laughing heartily. "Pray what are you laughing at, Mrs. Hen?" said the fox, to which she made reply: "How do you explain your actions, and that of the dog with your proclamation?" "Well," said the fox, "I guess that blankety son of a gun

hadn't heard the news." I guess "G. R. T." hadn't heard the news.

ONE OF THE OBJECTIONABLES.

To the Editor of the Jewelers' Circular:

I am reminded by the receipt of the November JEWELERS' CIRCULAR, of my neglect to renew my subscription to that truly wonderful and invaluable paper, so I enclose check herewith, which I trust will make me clear of the books, and entitled to receive it for another year, for I find I cannot do without it. Yours truly,
Chicago, Nov. 12, 1886. C. A. W.

To the Editor of the Jewelers' Circular:

Check for \$9 enclosed. Success to THE CIRCULAR. Think it is still ahead. If I can do you a turn at any time please let me know. Respectfully yours,
New Bedford, Mass., Nov. 9, 1886. G. B. W.

To the Editor of the Jewelers' Circular:

Find my subscription for one year more for THE CIRCULAR, which is my best companion for Sundays, and which I could not do without. It is the best paper for its kind published. I have learnt from it more than would pay for its cost for many years. Don't miss me a number as long as I live, as I would not know how to do without it. Sorry I could not write something for it from here, but can't get the time to do it, although I would like to very much. Yours very truly,
Chatham, N. Y., Nov. 12, 1886. E. D. R.

CORDIAL, BUT SOMEWHAT PERSONAL.

To the Editor of the Jewelers' Circular:

I would be much pleased to receive one or more of your "Fashions in Jewelry," as soon as ready. I have been a subscriber for your very valuable CIRCULAR since 1876, with the exception of one year I believe, which I regret. I look forward to the coming of THE CIRCULAR month by month, and it seems like a visit from an old friend, especially away off here. It is most welcome, being invaluable and absolutely necessary, to keep one posted on what is transpiring in the great centers of trade, as well as regarding the history of the trade, notices and sketches of the lives of the great horologists, etc.

No one in the trade, either beginner or more finished workman, can afford to be without such a journal of general information, relating to the many departments of our business. Those who do not subscribe must be indifferent to having an intelligent knowledge of the business, both mechanical and mercantile, or be quite oblivious to what a fund of valuable and interesting information he misses by being without THE CIRCULAR. I would for one be much interested to know something of the origin of the index plate, the chief makers, etc. I am, very respectfully yours,
Vancouver, B. C., Nov. 1, 1886. C. B.

Isochronal Hair Springs,

Including "Excelsior's" Isochronal Spring.

By CHARLES EDGAR FRITTS ("Excelsior"),

Author of "Practical Hints on Watch Repairing," etc.



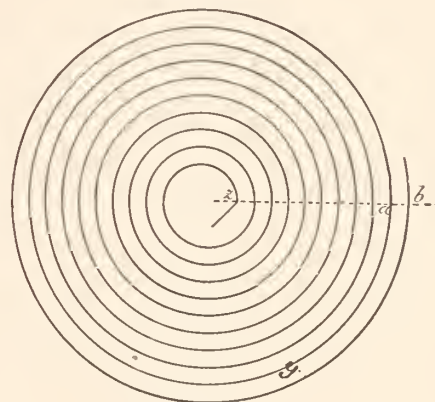
AN ISOCHRONAL hair spring is so essential to time keeping that it has been well named the "soul" of the watch. The conditions of isochronism have, therefore, been the subject of many investigations and experiments, and much theoretical hair-splitting and mystery have been indulged in by those who profess to know them. Nevertheless, there is nothing supernatural or occult about

isochronism, but it is a matter subject to ordinary mechanical laws and conditions, and may be treated in a plain, common sense way like any other mechanical problem. A knowledge of the requirements to be met will not only enable us to test the springs in use, recognize their merits and detect their faults, but it may also assist us to devise a new form of spring which shall possess the merits without the faults. Let us see what those requirements are.

An isochronal hair spring, attached to a vibrating balance, is one which causes vibrations of unequal extents to be performed in equal periods of time. The principal conditions which must be complied with to obtain this result may be briefly stated as follows: 1. The spring, in coiling and uncoiling, should remain concentric with the center or axis of the balance. 2. It should not, in any of its positions, crowd the balance pivots against the sides of their jewel holes. 3. The strength of the spring should increase and decrease in proportion to the angle of motion by the balance while it vibrates. 4. It should be hardened and tempered in order to permanently preserve its shape, and the hardness or temper should be uniform from end to end so that the flexion of the spring may be uniform in its different parts.

A considerable number of forms have been devised to meet these conditions, but, without specifying them all, it will suffice to say that there are now known only three forms which are considered to be of any practical importance. These are the cylindrical spiral, the Breguet and the plain, flat spiral. The two former are spiral springs, provided with over coils or terminal curves to improve the action of the spiral body. We will, therefore, begin by analyzing the action of the spiral to find its defects, and then see to what extent the terminal curves are capable of remedying them.

Fig. 1



In fig. 1 we have a well formed and uniformly tempered flat spiral, extending from the center to the point *b*, where we will suppose, for the moment, that it is properly pinned in the usual stationary stud. It has been found that, provided the spring has coils enough to act freely, there is an "isochronal point" in every coil above that number, *i. e.*, a point where the spring should be pinned in order to get the best action of which it is capable. In this case we suppose that point to be at *b*, where we have pinned it, as before stated—and we have done all that the most skillful workman can do to make it isochronal.

Now, let us see whether such a spring can fulfil the conditions of isochronism. It evidently cannot fulfil the first or the second, for its outer end is fixed, and not only cannot itself be concentric, but it must also produce more or less deformation of the greater portion of the spring, and crowding of it first to one side and then to the other, as the spiral expands and contracts in size. In order to remedy this, it is customary to give the spring a large number of coils, so that the one or one and a half revolutions of the balance, being distributed through so many coils, shall produce less change in the position of the outer coils, and the effect of the fixed stud will be less injurious. But this effect is only mitigated or "diluted"—it is not removed.

And the practice referred to introduces two very serious evils. It

necessitates the use of thicker "ribbon" for the spring in order that the long spring may have the same effective strength as the shorter one which might and would otherwise be used, and this spring is less flexible and perfect in action than a thinner one. The long spring is also subject to wavering or trembling, *i. e.*, the coils intermediate between the inner and outer ends are easily shaken up, down and sideways, changing the form of the spring as a whole, and consequently destroying the uniformity of its tension. Even if these coils are not shaken into actual contact with the balance or with the plate or cock—which might easily happen—it needs no argument to show that a spring whose belly is wobbling about and changing its form with every jar is not one to which we would reasonably look for perfect isochronal action.

Can a flat spiral pinned in a fixed stud fulfil the third condition? In order to make the principle perfectly obvious, let us suppose that the spring is wound up by the balance so that the coils are almost in actual contact, from the center out to the point *y*, and that when so wound the outer coil is in the position occupied by the third or fourth coil in fig. 1, and that from the point *y*, so drawn in, it runs to its end in the stud at *b*. (Of course, the spring is never wound up to that extent in practice, but the principle is the same, and this illustration of it will make the idea clear). Now, if we can take this terminal portion *y b* and lay it over the other coils, the point *b* will no longer lie in the dotted radial line *z b*, but will come some distance above *a* on the outer coil. And the shorter the spiral is the further up will *b* lie, and *vice versa*. If, then, the tension or strength of the spring increases proportionately to the angle of movement by the balance, in the case where the outer coil of the spiral remains concentric with the balance and the point or end *b* remains on the radial line *z b*, as it should do to be isochronal, it evidently would not increase in that proportion in any case where the point *b* falls above or below the dotted line when so moved towards the center. And, as we have seen that the point *b* would always come above that line in such cases (when a fixed stud is used), it follows that a flat spiral whose outer end is held in a rigid stud cannot fulfil the third condition. The longer the spiral, *i. e.*, the greater the number of coils in it, the more nearly can it come to doing so, but it can never quite reach it.

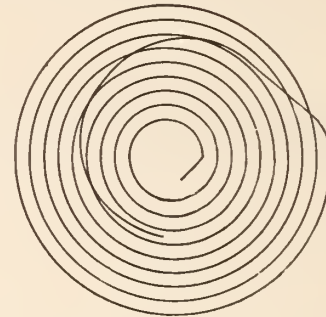
As regards the fourth condition, the flat spiral is decidedly superior to the other forms named. And although it fails to fulfil the other three, yet it is surprising that it performs so well as it does under the unfavorable conditions in which it is tried. We can readily anticipate therefrom how perfectly it would act if enabled to vibrate freely as a spiral and show out its capabilities.

I have omitted all mention of a regulator, but it is evident that if the length shown, from the center to the point *b*, is that which is best adapted for isochronal action, then the use of a regulator, by virtually shifting the position of the stud and changing the acting length of the spiral would be injurious, if not destructive, to the isochronism of the spring. It is generally supposed that a regulator is not detrimental with a flat spiral spring, but the only reason for thinking so is that the performance of that form of spring is usually so inferior, so far as isochronal action is concerned, that the injurious effect of the regulator upon it is not noticed. It is well understood to be injurious with an adjusted Breguet spring, because the normal action of that spring is so good that the regulator is at once seen to be objectionable, even when confined to a short concentric arc near the stud. With the cylindrical spiral it is inadmissible.

Let us next examine the Breguet spring. This consists of a flat spiral body, whose outer end is not fastened in a stud, but curved upward and then joined to an overcoil of an unnameable form, but which never fails to make the conscientious adjuster realize that it is "fearfully and wonderfully made." This overcoil is curved above the spiral and inward toward the center. It is given various forms by different makers, but the one shown in fig. 2 may be taken as a type which is more or less closely followed, as often, perhaps, as any that could be selected.

The real object in view, in all of them, is to enable the spiral to fulfil the conditions before stated. We may consider the junction with the overcoil as a movable stud for the spiral, and the overcoil itself as a flexible support for that stud. The *desideratum*, then, would seem to be to so adapt the length and form of the overcoil that the end of the spiral shall move towards and from the center

Fig. 2



just enough to keep its outer coil concentric with the balance during its entire vibration, at the same time fulfilling the second condition, and so yielding to the spiral that its end (or the virtual stud) keeps on the radial line while vibrating.

In reality, however, that principle does not seem to be kept in view, for, in all of the forms of Breguet terminal curve that I remember to have examined with reference to that point, the end of the spiral has invariably been *dragged back* during the coiling up of the spring, and generally to a considerable distance. This involves a loss of strength in the spiral corresponding to that distance. In order to make up for this loss and cause the strength of the entire spring to increase in the proper ratio, the tension or strength of the overcoil must evidently increase so much the *more* rapidly than the proper ratio, so that the two together may have just the correct ratio of increase in coiling up. That is to say, the custom is to ignore the fundamental law of the spiral form of spring—that a certain length and mode of pinning are most favorable, if not absolutely essential, to isochronal vibration, and compels the adjuster to treat the spring *as a whole* by a tentative process of promiscuous and aimless bendings and twistings, in which neither theory nor practice can guide him to any great extent, and whose most likely outcome is disappointment and disgust. Whatever may be thought of the cut-and-try plan elsewhere, it certainly has no rightful place in adjusting. It is better to have some principle to work upon—to make a distinction between the two parts of the spring, remembering and observing the laws that govern the action of spirals, and treating the terminal curve for what it is—a flexible and adjustable attachment for the outer end of the spiral, and whose sole object is to enable the spiral to properly perform its function.

Looked at in that light, we find that the Breguet overcoil must accomplish the following results: 1. It must preserve the isochronal length of the spiral. 2. It must enable the outer end of the spiral to travel towards and from the center at the proper rate as it coils and uncoils. 3. It must yield or bend in such a manner as to keep the entire spiral concentric with the balance, not crowding it in any direction whatever, but leaving the balance pivots free in their holes. 4. It must enable the spiral (and the spring as a whole) to increase and decrease in strength in proportion to the angle of motion of the balance. 5. The length and strength of the entire spring must give the proper rate or time. Can it do that? If not, then the Breguet spring cannot be perfectly isochronal.

Even when treated in the methodical way which I have suggested, in order to give the Breguet every advantage in this consideration of its qualities, it is no easy matter to reconcile these requirements, as adjusters will know. The second and third, which might be thought almost identical, are often almost irreconcilable—a form which suits one being often incompatible with the other. In any event, the final

result must be a sort of compromise, whose excellence depends greatly on the "knack" of the workman.

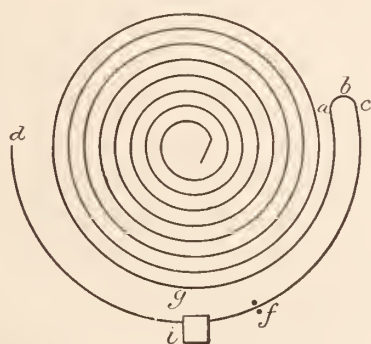
Substantially the same remarks apply to the cylindrical spiral. In both this and the Breguet, the tension of the spring being in different planes causes a tendency to twist, which is always objectionable and often extremely detrimental. We may, therefore, add a sixth requirement, to wit, that the perfectly isochronal hair spring should have both the spiral body and the overcoil or terminal curve in one and the same plane. The peculiar and irregular forms of these springs also render it difficult, if not practically impossible, to give them a uniform hardness or temper throughout their entire length, which we may call the seventh requirement. For, if they do not fulfil that, they can have no pretensions whatever to either perfect action or stability.

We have seen that the usual plain flat spiral with a fixed stud cannot be perfectly isochronal. While it would be rash to say that it is *impossible* for the Breguet or the cylindrical spiral to be perfectly isochronal, yet, in view of their confessedly bad points and of the numerous and conflicting requirements to be met, it may candidly be questioned how many watchmakers have ever seen one that was so.

Can a perfectly isochronal hair spring be made? I maintain that it can. The ground to be covered is mapped out before us, and we can now see pretty clearly what is required. The spring must be a spiral, because we cannot otherwise get the requisite length in small compass, and it should be a flat spiral for many reasons. The ribbon should be thin and flexible. The spring must have an overcoil or terminal curve, because the spiral cannot be perfectly isochronal without it, and both should be in one plane. They should also be in one piece, because the weight of a suspended connecting stud would be objectionable, and, what is of far greater consequence, a two piece spring would be practically worthless from the uncertainty of its form, action and stability. It must have a certain regularity of formation in order to secure regularity of movement. Its action should be simple and easily understood. It should be cheap and easy to make, fit and use, and to harden and temper uniformly. It must be easy and certain of adjustment to secure any desired action, to suit all circumstances and uses. Above all, it must be perfectly isochronal.

I will now describe the spring which I have invented with the object of meeting all of these requirements, and some others which will appear in the description.

Fig. 3.



As will be seen in fig. 3, it is a flat spiral with an overcoil in the same plane as the spiral. There is a distinct line of demarcation between them which is always maintained, thus preserving the isochronal length of the spiral. As regards adjustments, my spring is peculiar, in that the results of manipulations upon it are definite and invariable. Even an intelligent apprentice can adjust it to such perfection that his tools fail to measure or detect any fault.

Adjustment is only needed, however, for first or individual springs. When one spring is got right—with the proper lengths and forms—that is your model, after which to pattern your forming tool for manufacturing duplicates in any desired number. And all such springs, for use in the same conditions, may at once be pinned in the stud

at the same point as the model, and they will be isochronal without adjustment.

For the first or preliminary trial, one may take a flat spiral already made, of suitable cross section, length and strength, evenly coiled, well centered and properly mounted in a collet—and bend the outer coil into the desired form with heated tools as usually done—being careful not to *soften* the metal in the operation.

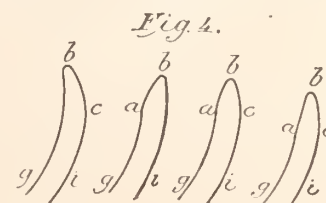
In the first place, make the bend *b* at that point in the coil where you would usually *pin* the spiral in the stud to make the spring isochronal. Make *cd* concentric with the center of the collet or balance, giving space enough between *cid* and *agd* to make the outer coil *agd* clear the stud at *i* in the largest vibrations. Then move *cd* through the stud till you find a point *i*, where the overcoil *ci* will yield to the spiral just enough to keep the *entire* spiral portion concentric with the balance during its complete vibration. The bend *abc* acts as a movable stud for the inner spiral, which, in pulling or pushing *longitudinally* upon the bend, draws it inward towards the center or pushes it outward from the center, carrying the outer end of the spiral with it.

Such a spiral (from the center to *a*) tends to be isochronal, but it *cannot* be so when pinned in a rigid stud as usually done. It is then only partially isochronal and within narrow limits of vibration. But my overcoil *cid* allows and enables it to vibrate freely and concentrically, and thus secures an isochronism which is *practically perfect*, even if the lengths and shapes are not exact.

In a few moments the spring may be finished, tested in the tool and ready for trial in the watch. Even when thus made its quality is at least equal to that of most of the springs in use. But I desire that only the *best* quality of springs, those which are fire-hardened and tempered while held in their final form, should be used in watches and chronometers, both for my own credit and for the most complete satisfaction of the users. This spring should be only for a model. But before describing the tool for its manufacture, let us further consider its form and character.

We first note that the *numerous coils* which are required with the plain spiral, in order to enable it to be approximately isochronal, are not needed here, owing to my overcoil facilitating and perfecting the action of the spiral. My spiral may be made shorter (smaller and with fewer coils), and the "ribbon" may be thinner and more flexible—the spring still having the same effective strength and power over the balance as the usual long spirals. The stud and the regulator pins may, if required, remain at the same distance from the center as with the ordinary flat spiral springs. Outside of the spring itself, therefore, no part of the movement need necessarily be changed. This spring can evidently be fitted in even the smallest and thinnest watches, or in any place where we would expect a hair spring to be used.

We also observe that the shape of the curve *abc* may be varied to change the "control" of the spiral over *ci*, instead of varying the length of *ci* as above directed for that purpose. The circular form of *abc*, as shown in fig. 3, is generally suitable. But, in some restricted situation, we may wish to make *ci* of some particular length, which would not give to the spiral the proper control over it. We may then adjust the control in other ways, viz.: 1. The wider *abc* is, *i. e.*, the greater the distance between *a* and *c* (or between *agd* and *cid*), the more control the spiral has over *bci*, and *vice versa*. 2. Making the apex of the curve nearer to *ga* and



curving *ic* over to meet it, as in fig. 4, gives the spiral greater control. 3. Taking the opposite course, as in the second cut in fig. 4, lessens the control and causes the overcoil to yield less to the spiral.

The form in the third cut in fig. 4 has a medium effect, similar to that of abc in fig. 3. We thus have two distinct methods of varying the control.

With regard to adjusting the spring to avoid any side pressure on the balance pivots, there will hardly be any necessity for that except when the spiral is very short and the balance vibrations very large, causing the bend abc to move through a long travel towards and from the center. In that case, it is only necessary to *lengthen* the bend abc , as shown in the fourth cut in fig. 4, representing the lengthening of the form in the third cut. If we suppose that the spring is in the act of coiling up, it pulls longitudinally (or downward in the figures) upon abc , the result being that the part ba is drawn *very slightly* to the right by the downward yielding of the bend abc , which would carry the outer end of the spiral in that direction. But at the same moment the whole of the bend abc is carried to the left by the yielding of the overcoil ci to the pull of the spiral, and thus the former motion is ordinarily offset by a slight excess of the latter. Lengthening the bend abc lessens the draw to the right.

To recapitulate: We vary the length of ci to adjust the path of a , the outer end of the spiral, to and from the center, on the radial line zb or above it (see fig. 1), to cause the strength of the spring to increase in proportion to the angle of motion by the balance; we adjust the shape of the curve abc to keep the spiral concentric with the balance; and, to preserve the freedom of the balance pivots (only necessary in exceptional cases), we vary the length of the curve abc . It is always expected, of course, that the length of the spiral is correct for isochronal action. Test all of these points with any suitable tool for measuring strengths and angles of motion.

Nothing could be more simple, more direct, more certain or more easy. No pains should be spared in this work, for it is just as easy and cheap to manufacture perfect springs as imperfect ones, by getting the *model* spring perfect and then making the forming tools to correspond.

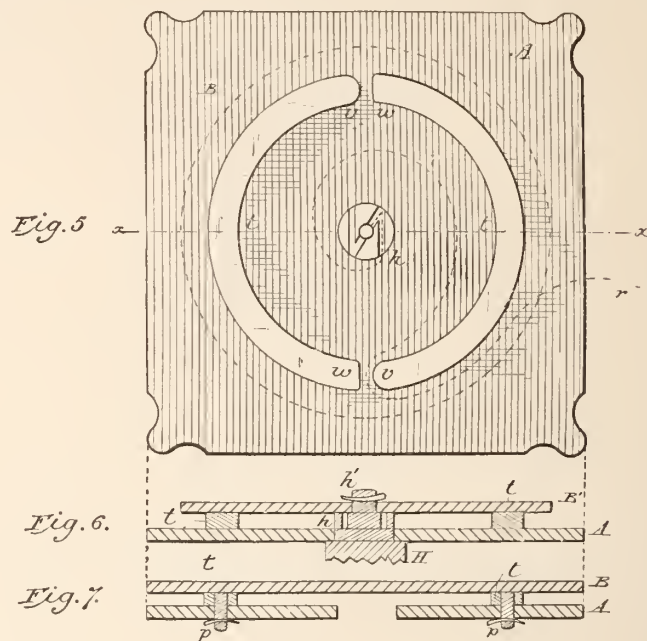
A regulator may be used with my spring, acting upon the overcoil, as is shown at f , in fig. 3, but it should be kept near the stud. When moved from the stud it stiffens and virtually shortens the overcoil ci , and lessens the control of the spiral over it. The influence of the regulator upon the rate is normal as with other springs; but the effect upon the isochronism is exceedingly small—being very much less than with the Breguet or with the usual flat spiral, and in ordinary movements would be imperceptible. Even if the regulator is moved so far as c (which should not be allowed), my spring is still far superior to the usual plain flat "isochronal" spirals *in their best condition*, on account of the yielding attachment at its outer end. The regulator has no effect whatever upon the isochronal length of the spiral in my spring, as will be noticed. A Breguet spring, whose regulator was moved to a similar extent, would be valueless for any purpose. But although a regulator is infinitely less objectionable with my spring than with any other form, yet I do not recommend its use. For chronometers, and whenever the best obtainable results are desired, I advise to omit the regulator and to time by the balance screws as usual.

The tool for manufacturing springs is shown by fig. 5 in a plan or top view, and figs. 6 and 7 are vertical sections in the line xx , fig. 5. A is a flat metal plate with winding arbor H projecting through its center; upon the face of A is a concentric raised ring with vertical sides, consisting of two templets or forms tt . The end or lip v of each one should have the form which it is desired to give to the bend abc —whether like those shown in figs. 3 and 4 or otherwise. The spring ribbon being drawn tightly over it and hardened while so held, receives the same form as the lip. The shape of the other end or lip w is not material—except for convenience of manufacture.

B' , fig. 6, is a transparent cover plate, made of agate or other suitable material, through which to watch the operation. A wire or "ribbon" of suitable material and cross section is inserted in each slot of the arbor, projecting out through the openings at vw , as represented by the dotted line r , and the cover B' is fastened on. Both

ribbons are wound in at once, by turning the arbor, till the cavity within the templets is full, (stopping with the slot in line with v to give the spiral the proper isochronal length), then each ribbon is drawn taut over its lip v and backward around the outside of the templet, and its end secured in any convenient way.

After inspection through the cover, if everything is correct, the whole is heated to make the "ribbons" set in shape. The cover B' and arbor H , fig. 6, are then removed, and the metal plate B , fig. 7,

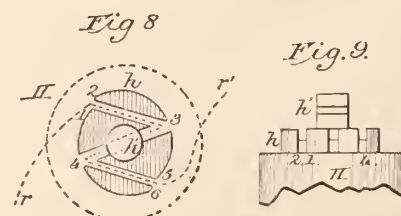


is fastened on. The central cavity left at h is filled solid with any suitable non-oxidizing powder (as charcoal dust, etc.); the end at h is plugged, and the whole is made ready for the fire-hardening, etc., in the usual way.

This is a general outline of the operation, but, of course, the details may be varied in endless ways. For instance, the entire winding, hardening, etc., may be done with the tool as shown in fig. 6, but with a metal cover plate, and the "setting," etc., omitted. Or, for cheap springs, tempered ribbon could be wound in and the "setting" would finish them. But it is so easy to fire-harden, etc., with this tool, that there is little excuse for making cheap springs.

Three or four templets may be made in the ring tt instead of two (or one), and as many slots in the arbor H ; and one, two, or even more, ribbons may be held in each slot and curved over each lip v , the whole lot being wound, hardened, etc., at once. For clock springs, whose coils are very open, this will be convenient. All of the overcoils may be cut off at the right length when wound, except one ribbon which is left long enough to give it an extra turn around the outside of the lot to keep their ends in their places, protect them from the air while heating, etc., and its end is finally secured by giving it a twist around the corner of plate A .

If three ribbons are curved over the lip v , the outer spring, being of a little different shape, will probably require to be pinned with ci a little shorter. This can be ascertained by testing in the tool. In such cases it is also well to make the arbor a little excentric, to enable the ribbons from one slot to ride evenly over those in the next one, and preserve the regular spiral form. This is shown in figs. 8



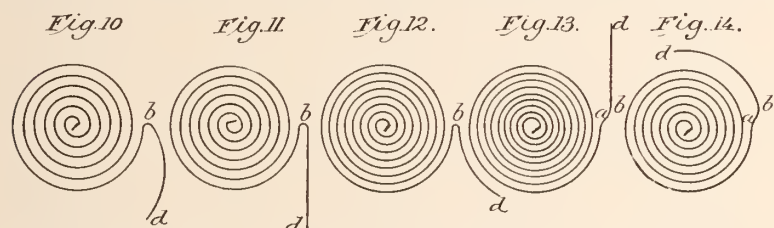
and 9, which are enlarged views of such an arbor. One ribbon is shown in each slot by the dotted lines r and r' , which are bent at an acute angle, and this angle is hooked over the shoulder at 3 and 4, to hold the ribbon while winding. The cross slot between 3 and 4

may extend through the arbor, or be merely cut in at each side. The points 2 and 6 project out beyond 1 and 5, equal to the thickness of the ribbons in the slots. The templets *tt* may also be similarly excentric for the same purpose.

In fig. 7 the cover *B* is shown as pinned on by posts *p* passing through the templets and plate *A*, but it may be otherwise secured. All of these details are largely matters of choice and may be left to the judgment and skill of the workman.

The ordinary watchmaker can make the templets *tt* separately, and secure them to a plate *A*, or he can turn the ring upon the plate in his lathe, and file up the lips *v* and *w* as he wants them. For large manufacturers the best way would be to make a punch and die and stamp the plate *A* right up with holes, templets and everything complete; the arbor head could be made in the same way with its slots, etc.

So much for the practical manufacturer, adjuster or repairer, to whom I offer my spring as able, I think, to fulfil all the requirements of the perfect spring, while being about as cheaply made as the plain flat spiral. To horologists, who may wish to study out the possibilities in the way of modifications and applications, I would say that my invention is not limited to the form shown, but I believe it is capable of being so varied as to bring about almost any desired manner of action. I show a few of these forms in figs. 10, 11, 12, 13 and 14. Each of them has a special mode of action which I need



not detail, as the horologist will have no difficulty in ascertaining its nature and the uses for which it is adapted. But for securing isochronal vibrations in watches and the like with the ordinary escapements, fig. 3 may be considered the proper form.

I have patented this spring in the United States,* but to all my fellow craftsmen in the old country it is free. They are welcome to test it, and, when convinced that it is superior to the old forms, I shall be not only entirely satisfied, but pleased, to see them discard the old and adopt mine in all their future work.

The Gems of the National Museum.

[BY GEORGE F. KUNZ.]

From Advance Sheets of the Annual Report of the U. S. National Museum for 1886.



THE COLLECTION of gems exhibited by the National Museum at the Cincinnati and New Orleans Expositions, is now on exhibition at the rooms of the Museum in Washington. This much needed accession, representing a small part of the appropriation for the World's Fair, promises to be one of the most attractive and instructive features of the museum. The large number of visitors who examined the collection, both at the fairs and in its present location, can testify to its interesting character. Although a mere beginning, it is the most complete public collection of gems in the United States. It is contained in three flat plate glass exhibition cases, the gems being neatly marked with printed labels and arranged on velvet pads with a silk rope border. The diversity, brilliance and richness of Nature's brightest colors displayed render the whole effect a very attractive and pleasing one. The collection begins with a suite of glass models of the historical diamonds, followed by a series of diamonds in their natural state, among which is

an interesting octahedron eighteen karats in weight,* and two smaller, though very perfect octahedra, of about two karats each. These specimens are good illustrations of the form from South Africa, though of little commercial value as gems. One dozen other crystals, from one-quarter to one karat in weight, complete a representative set of form and occurrence in that region. Next we have a very neat set of a dozen more crystals, small but choice, principally from India and Brazil, and formerly belonging to the Mallet collection. One of these is a perfect cube, a form peculiar to Brazil, while another is twinned parallel to the octahedron. Another stone of one karat is only half cut, and for comparison we have a stone of about the same weight completely cut.

Among the sapphires we find a karat oblong stone of dark blue color from the Jenks mine, Macon County, North Carolina, which has yielded a few fair sapphires, yellow, violet and blue, and a few rubies, some of the finest of which were in the Leidy collection; also the first stones found here, the dark-brown, asteriated sapphires, described in "Transactions of the New York Academy of Sciences," March, 1883, and two other cut stones weighing from four to eight karats. These all show a slight bronze play of light on the dome of the cabochon in ordinary light, but under artificial light they all show well defined stars, being really asterias or star sapphires and not cat's-eyes, as would seem at first glance. There are also two cut stones, light blue and light green, weighing one and two karats respectively, which, for light colored sapphires, are perhaps, when cut, brighter than those from any other locality. The cutting of one of these gems has given it a remarkable luster. They are found in the sluice boxes at and near Helena, Montana. Following are two broken crystals of the dark green sapphires from the quite recent find at the Hills of Precious Stones in Siam, beautifully dichroic, being green and blue when viewed in different axes. The most showy group among the sapphires is a lot of thirteen assorted fancy stones, ranging from a half to four karats in size. It includes two Oriental amethysts, one Oriental topaz, two pale rubies, four blue, one light blue opalescent, one pale green and two white sapphires. An asteria of good blue color, measuring nearly one inch across, a beautiful two karat ruby asteria, and a small three-quarter karat ruby of fair color complete the corundum gems.

The series of spinels is well chosen and vari-colored. It consists of a long two karat stone of green color, an oblong almandine colored stone of three karats, an inky stone of one and a half karats, a half karat ruby spinel of fair color, a pretty rubicelle of three-quarters of a karat, and a suite of crystals of the ruby-colored spinel from Ceylon and Burmah. We have also a cut Alexandrite (so called after the Czar Alexander I.) from the original Russian locality. This is of fair color, but the wonderful Ceylonese gems of recent years have really given to this phenomenal variety of chrysoberyl, which changes from green to red under artificial light, its present high rank among gems. There is a six karat typical chrysoberyl, finely cut (the chrysolite of the jeweler), truly, as the name indicates, golden beryl, and a dark green one of that shade repeatedly sold as Alexandrite, though it does not change color by artificial light; also a rich yellowish-brown specimen of one and a quarter karats. A set of seven rough fragments from Brazil is instructive by comparison.

Among the beryls we have a flawed emerald of ten karats that well illustrates the typical color, as does a pear-shaped drop of about the same weight and quality. Besides these, there is a flawed stone of about the same weight, but much lighter in color, from Bogota. There is also a crystal that has been in the institution for many

* Gems are generally bought and sold by the weight, called a *karat*, which is equal to about 3.168 Troy grains. It is usually divided, however, into four diamond or pearl grains, each of which is .7925 of a true grain. Fractions of a karat are also known as fourths, eighths, sixteenths, thirty-seconds and sixty-fourths. The weight of the karat formerly differed slightly in different countries, and this diversity finally led a syndicate of Parisian jewelers, goldsmiths and gem dealers in 1871, to propose a standard *karat*. This was subsequently confirmed by an arrangement between the diamond merchants of London, Paris and Amsterdam, fixing the uniform value of the *diamond* (?) karat at 205 gramme.

* For address, see advertisement in *Special Notice* column.

years, labeled from New Mexico. An emerald crystal one and an eighth inches long one of a series of minerals brought by Professor J. D. Dana from Peru when with the Wilkes Exploring Expedition, is historically interesting. It was purchased by him in the streets of Callao. In the same series are two good cut beryls, one six karats in weight, of a light green color, another one karat light blue, both from Royalston, Massachusetts, and perhaps the finest specimen ever found at the Portland (Connecticut) quarries, fifteen karats in weight, and of such a rich, deep sea-blue color as almost to rival in splendor the matchless five karat Brazilian blue stone that is in the same case. A fine blue beryl from Mourne Mountain, Ireland, is interesting for its locality and deep color. Stoneham, Maine, has contributed a two karat white cut stone and a similar fragment; while Siberia is represented by a common white stone of about six karats weight, and a rich yellow one of two karats.

Next comes a series of the emerald green and greenish yellow varieties of spodumene (variety Hiddenite), embracing crystals and fragments and five cut stones, the latter weighing from a quarter to three-quarters of a karat, and varying in color from green to greenish yellow, from Stony Point, North Carolina; also a quarter karat, light yellow and a one karat golden yellow spodumene of the variety resembling chrysoberyl, described by Pisani, of Paris, in "Comptes Rendus" for 1877, from Brazil. The mountain green cut euclase of two karats weight from Brazil, and the white cut phenakite of three karats, from Russia, are of rare occurrence, though the latter has recently been found at two localities in Colorado.

The tourmalines include a dark red gem (rubellite) of six karats weight, and good color; a dark green one of the same weight; two light red ones of one-half karat each, and a fine dark blue one (indicolite) of three-eighths karat; a light sea green one of the same weight as the indicolite and four long bottle green (called Brazilian emeralds) of two karats each; two olive green stones of two karats each, and five sections of green crystals that have red centers. This difference of color between the outer and inner crystals is peculiar to tourmalines, as many as three colors being found in one crystal. All these are from Brazil. The well-known domestic localities are represented by an oblong, table cut, light green stone from Paris, Oxford County, Maine, that once held a conspicuous place in the collection of Dr. Joseph Leidy, which, unfortunately, had to be scattered. From Auburn, Maine, a locality quite recently discovered, we have a one karat blue indicolite, two lavender colored stones of one and a half and two karats each, a light emerald green stone of three-quarters of a karat, as handsome as an emerald by artificial light, and a two karat green one, of the same tint as the Leidy stone; also a suite of several dozen loose crystals of various colors. A one karat white, cut tourmaline, deposited by Mr. Joseph Willcox, is from DeKalb, N. Y. The neighboring two karat yellow and three karat yellowish brown cut stones are from Ceylon. The fine two inch grass green crystal and one-inch bluish green crystal are also part of the treasure brought home by Professor Dana from the Wilkes Expedition of 1838-42.

A six karat blue and a two karat sherry colored topaz from Siberia are exceedingly brilliant; but the domestic reputation is well sustained by the white fifteen karat cut stone from Pike's Peak, Colorado, which is not surpassed in beauty by the brilliant white four karat (Minas Novas) from Minas-Geraes, in Brazil. A six karat orange yellow stone, also from Minas-Geraes, is quite characteristic of the topaz, which is most commonly used in jewelry. A series of two cut stones, of five and eight karats respectively, and a number of crystal fragments show the effect which heat has upon some varieties of topaz. These specimens vary in color from dark pink to white, according to the degree of colorification.

Among the garnets are ten flat, brilliant cut stones, one carbuncle, two long table cut stones, and six rose cut, from Bohemia; six Tyrolese red garnets, three essonites (usually sold as hyacinths by the jewelers), four karats, one and a quarter, and a quarter karat, from Ceylon, six small brilliant cut stones from Cape Colony, and a series;

cut and uncut, from New Mexico, which furnishes the finest garnets in the world in point of color. In addition to these, we notice a one karat and a one and a half karat demantoid (green garnet or Uralian emerald) from Bobrowska River, Syssersk, in the Urals, and a brownish green two karat stone from the same locality.

From New Mexico we have a fine yellowish green peridot or olivine of two and a half karats, called chrysolite by the mineralogist, but not by the jeweler; also a number of pebbles of the same, known as "Job's Tears" locally (from their pitted, tear-like appearance). The Orient is represented by a beautiful olive green cut stone of about fifteen karats weight.

From the zircons or jargons we may single out for remark a number of small cut stones, yellow, yellowish brown, steel blue and white, the latter color being often produced by heating. Stones of this kind were at one time used for incrusting watches, which were then sold as diamond incrustated. Next we observe a fine, rich, hyacinth colored gem (the true hyacinth of the mineralogist), a two karat green, a yellow, an orange and a long brownish green three karat stone, all from Ceylon. The two karat axinite from Dauphiny is one of the rarest of gems. A six karat greenish brown epidote from the Knappenwand, the well-known locality in Tyrol, should be mentioned.

Here, too, is a one-fourth karat idocrase from Ala, in Piedmont. This mineral, which received the name vesuvianite, because it is found among the formations in the lava at Vesuvius, is sold by the Neapolitan jewelers, and used to make the letters I and V in the manufacture of initial or sentimental pieces of jewelry. The same mineral is found at Sandford, Maine, and other localities here; but rarely in gem form.

Iolite (dichroite, cordierite), or water sapphire (*sapphire d'eau*), as it is also called, is here seen in the form of a flat cut stone, of two karats weight, from Ceylon, and a cube, one-fourth inch square, from Bodenmais, Bavaria. These are not comparable with one found at Haddam, Connecticut, that was worn as a charm by the late Dr. Torrey. This stone has dichroic properties; if viewed in one direction it appears blue; if in another, pure white.

The five karat titanite, or yellow sphene, is from the Tavetchthal, in the Tyrol. This gem shows the play of colors peculiar to the diamond. Specimens have also been found at Bridgewater Station, Pennsylvania. There are two long andalusites, of one and two karats weight, at times so dichroic that they have been offered in London as Alexandrites; also a square brilliant cut stone of one karat. No stones in this collection show the dichroic property to the visitor so perfectly as these, which are so cut as to show the red and yellowish green colors at once from the same point of view. These are from Brazil, where fine green ones are also obtained.

Next in order is a light green diopside, from DeKalb, New York, a locality which has yielded twenty karat gems, of rich oil green color, equal to the two and a half karat cut stone from Ala, in Piedmont.

A small, long, one karat Kyanite, from Russia, is noteworthy; as is also the suite of opals, consisting of two noble cut stones from Hungary, and a polished slab of the light matrix from the same place, beautifully mottled with opalescent spots; a set of over twenty gems, white, yellow and brown, from Querétaro, Mexico; two milky opals without the play of colors, from Honduras, an inch and an inch and a half long respectively; three pieces of blue opal, in the impure brown limonite, or iron stone matrix, from the Baricoo River, Queensland, Australia, termed opaline by the jewelers, and a cut stone from the same locality.

Of turquoise, we have a bluish green piece, one inch and a half long, cut into a flat cabochon stone, from Los Cerrillos, New Mexico, a fine suite of the mineral in the matrix, recently brought on by Major J. W. Powell, from New Mexico, and a set of twenty-four gems from Persia, showing all the characteristic gradations of color between blue and green; a curious three-quarter inch cabochon cut

stone, and a piece one and a quarter inches long in the matrix, from Persia, noticeable for the pleasing contrast of the bluish green stone on the background of the chocolate colored matrix. A handsome suite, consisting of a one inch flat cabochon and seven polished specimens of turquoise in the matrix, from Los Cerillos, New Mexico, has lately been deposited by Mr. Thomas Donaldson, of Philadelphia. These vary in color from the malachite green to the rich light blue, and in size from one by two by three inches to three by four by six inches.

Hematite is exhibited, cut in the form of balls and in a cut intaglio. Displayed near these is a cut, one karat rutile, from Alexander County, North Carolina; this so closely resembles the black diamond in color and luster as to have been mistaken for it, when first found.

A dark, almost black hypersthene, from Norway, shows a pleasing bronze-like reflection on the dome of the cabochon; while a polished slab of lighter color is also quite attractive. Chlorastrolite is represented by three small polished pebbles from Isle Royale, Lake Superior. One of the most instructive of the series is a quantity of gem gravel from Ceylon, containing sapphires of various colors, chrysoberyl, zircon, quartz and other stones.

A series of the American stone, Thomsonite, found as pebbles in the Lake Superior region, presents some fine cut stones, with the circles from one-fourth to three-fourths of an inch across. A few large, polished pieces measure over one inch across. Some pebbles of Lintonite, a green variety of Thomsonite, from the same locality, are also polished.

The quartz array is very instructive. It begins with a two and a half inch Japanese crystal ball, and an eagle seal three inches high, of Russian cutting; a smaller ball and a combination form of the cube and dodecahedron, from Japan, and half of a Brazilian pebble, polished, complete the display of Rock crystal. Cut citrines, cairngorm, and the so-called smoky, Saxon or Spanish topaz, eleven of the dark purple amethysts from Siberia, often wrongly called Oriental amethysts, and a set of seven from Brazil, show all the changes from light pink to dark purple.

Perhaps the most unique gem of the collection is a piece of amethyst that was found at Webster, North Carolina, and deposited here by Dr. H. S. Lucas. The present form is just such as would be made by a lapidary in roughly shaping a stone, preliminary to cutting and polishing it. It now measures seven centimetres in length, six centimeters in width, four centimeters in thickness, and weighs 136.5 grammes. It was turtle-shaped when found, and this was said to have been the work of pre-historic man. This shape was unfortunately destroyed by chipping it to its present form. It is perfectly transparent, being slightly smoky and pale at one end; it also has a smoky streak in the center. This coloring is peculiar to the amethyst, however. There are also a three-quarter inch yellowish quartz cat's-eye from Ceylon, a three karat green one from Hoff, Bavaria, and a native Indian necklace from Ceylon, composed of numerous yellowish quartz cat's-eye beads of about three karats each. There has been recently added to the collection a handsome Siamese ring of cat's-eyes and chip diamonds. The rich gold setting is a model of exquisite Oriental workmanship, the reliefs seeming to have been hammered, rather than engraved. The handsome embossed flowers within the ring cannot be seen in the case. Its crown is a pyramid, thirteen mm. high and twenty mm. across the base. The base of the pyramid is surrounded with a row of fourteen cat's-eyes; above this is a row of chip diamonds, while the apex is formed of the largest and finest cat's-eye of the lot. On each side of the crown, on the shank, is a handsome cat's-eye, next in size to the stone which forms the apex.

We have, then, a beautiful series of the brown quartz cat's-eyes, so-called crocidolite cat's-eyes (also called tiger eyes), in fine slabs, balls, buttons, etc., which is really a combination of crocidolite fibers coated with quartz. This incasing renders it harder than unaltered crocidolite, which is to be seen here together with it. Alongside of

these are four handsome stones, cut cabochon and artificially colored pink, purple, green and gendarme blue by aniline dyes, after the extraction, by a strong acid, of the original coloring matter, limonite and crocidolite, from the quartz casing. All these are from South Africa. Superb rutiled quartz (sagenite, *flèche d'amour*, Venus hair stone, or Love's arrows), in the rough and in cut form, are from North Carolina. Rhode Island contributes black hornblende blades in quartz, and green actinolite in the same (the Thetis hair stone of Dr. Jackson). The actinolite, when in straight layers in the quartz, occasionally forms a quartz cat's-eye, if cut across the fibers. The Thetis hair stone from Japan is one of the most interesting and beautiful stones in the series of sagenitic quartzes.

The large pieces of black onyx, chrysoprase, carnelian, sard and sardonyx, and the series of agates of various colors, are cut into a variety of forms; the fine three inch square slab of "gold quartz," of the jewelers is from Grass Valley, California.

Fine aventurine quartz, with spangles of mica in a rich, reddish brown quartz, from Russia, vases of which are often worth thousands of dollars; and a fine green aventurine, called imperial jade by the Chinese, and more esteemed by them than any of the true jades, deserves attention. The series of fifteen small Indian moche stones is very attractive; the black, moss-like markings are relieved by the red spots in the gray body of the stone, thus presenting a surface beautifully diversified. A six by four inch slab of moss agate attracts much attention, different people seeing in its markings various bits of fancied scenery. A two by four inch slab and a circular disc, one inch in diameter, are good representative pieces of the bloodstone or heliotrope, so much used in rings and seals. A rich, brown, speckled jasper is worthy of notice. The series of quartzes closes with three polished pieces of silicified wood.

The two cut moldavites (Moravian bottle glass), about one inch across, are of rare occurrence. They are transparent, dark green obsidians, from Moravia, for which worthless green bottle glass has sometimes been sold.

The two sunstones from Norway—the largest one and a half inches long, the other a three-quarter inch cut cabochon—are indeed fine; but a cut stone of the same material, from Delaware County, Pennsylvania, the same length as the larger specimen from Norway, is nearly equal to them. A group of fourteen moonstones, of various sizes, from Ceylon, and two from Norway, one, a half inch long, the other, an inch, make a handsome display, grouped with the sunstones and smaller labradorites. The last-mentioned species is fully represented, some polished pieces being over one foot across, and a number showing the beautiful chatoyant colors to perfection.

Amber, yellow, transparent, and containing flies and other insects, is present in the form of cut stones, cuff buttons, a breastpin and beads; also in the form of large pieces, with one side polished, and large "tear drops," which are of special educational interest.

A rich, dark brown cut aregonite from California, and the beautiful green, copper colored Smithsonite (a zinc ore), from Laurium, Greece, demand special notice. One is a cut cabochon one inch long and a half inch high, the other an ideal piece of the natural mineral. We observe also a fine polished malachite from Siberia, and a smaller breastpin piece; also a dish of the highly prized dark blue, or, more accurately, dark purple, fluorite from Derbyshire, England, where it is familiarly known as "blue John." Vases of this material have often been sold for over one thousand dollars. Two small polished pieces of the Persian lapis-lazuli, and a slab, eight inches across, and one four inches, of the white veined variety, from the Peruvian Andes, well represent this species. A jade pendant, three inches long and of good color, is one of the sort made in Germany to sell in New England as genuine aboriginal workmanship. Also a flat vase made of a gray Chinese jade, and one of the small bracelets of the same material, light green in color, which are put on the arms of girls in early childhood, and allowed to remain there until the natural growth of the arm fixes them so tightly that

they can not be removed over the hand. To the jades have recently been added a rich deep green slab from India, an Alaskan jade labret, used by the Alaska Indians as a lip ornament, and a Chinese jade inkstone holder, mounted on a base of carved teck wood. This is the most elaborate jade in the collection, the body of a dragon forming a cell for water, the mouth of the cell being a hole in the dragon's back. The beast's forepaws and head rest upon the edge of a rectangular trough, which is intended to hold the inkstone. From this he appears to be drinking, while a smaller beast, whose head just appears above the edge at the other end of the trough, watches his powerful enemy with a stealthy, malicious fear. A rich, dark green flower, chiseled out of serpentine, six inches by three, is very pretty, as is a curious, fanciful, turtle-like talc ornament from Southern India, the shell of which is beautifully carved into a network of flowers, and a carved toilet box of the same material from the same locality. Besides the serpentine flower, there is a handsome turned vase, eight inches high, grayish green, crossed and re-crossed with very dark, olive green streaks, giving it a mottled appearance; also a handsome, polished slab of williamsite from Texas, Lancaster County, Pennsylvania, six by ten inches, a small flower ornament from San Francisco, a paper weight and two massive specimens of green serpentine, spotted with red, from Cornwall, England, and a polished fancy specimen of bowenite from Rhode Island. Red, white and mottled agalmatolite (Chinese figure stone), from China, is interesting. There are three carved specimens, representing human beings, and another, much more elaborate, representing a parting scene on the seashore. The remaining specimen of agalmatolite is a handsomely carved tray, on which is represented a typical Oriental scene, with all its wealth of luxuriant vegetation. This well preserved specimen was brought from Japan to Holland by the Dutch merchants in the sixteenth or seventeenth century, and was recently deposited in the Museum by Mr. G. Brown Goode, the Assistant Director.

One of the finest specimens of its kind in the United States is a magnificent six by four slab of lumachelle ("fire marble") of fossil origin, in which the color of the original shells is so deepened and intensified that it rivals the finest fire opal. This comes from the old, exhausted locality of Carinthia, Austro-Hungary. Of alabaster, we have white, yellow and cinnamon gray slabs; of fossil coral, a fine slab from Iowa City. The oölite limestone from Bristol, England, is curious; the surface is highly polished, presenting a white field flecked with dark red. Beads of gypsum satin spar and a three inch egg of the same material are from Bridgeford, England. A wavy slab of polished light brown barite, having its surface variegated with dark brown spots, from Derbyshire, England, is rather interesting. A slab of jet from England, one from Germany, and another from Colorado are exhibited near two handsome carvings, in cannel coal from Simpson's Coal and Lead Mine in Missouri. One of these last represents a scene in a coal mine, and the other a bouquet of flowers. A cannon twelve inches long, mounted on truncheons, and an egg-shaped paper weight, both made of the travertine of Gibraltar, and a small light green slab of polished stalagmite from Baird, California, are among recent additions, as are ten rough, perforated garnets from an ancient grave in Bohemia, and a silver bar pin, set with bloodstones and agates, the last the gift of Messrs. Harris & Shafer, of Washington.

The collection ends with an eight by three slab of catlinite (Indian pipe stone), and a large Indian pipe of the same material, from Coteau de Prairie, Pipestone County, Minnesota. The head delineated on the slab was carved by a Washington sculptor, and came into the museum with the Abert collection.

The foregoing article by Mr. Kunz fairly represents the condition of the gem collection on July 1, 1886. Since it was written, however, several additions have been made to the collection, as follows:

One hundred and fifty-two cut stones of agate, jasper, chalcidony, heliotrope, etc. These vary from one-half an inch to two and a half

inches in diameter, and are finished ready for setting in jewelry. They cover a wide range of marking, color and style of cutting, and include a fair number of artificial colored stone.

Two fine masses of rutilated quartz from Brazil, polished on one side only. Also one scarf pin of rock crystal, and a pendant of the same material.

A good ring stone of amethyst from Stow, Maine, of deep color.

A cut stone of rose quartz, from France, showing a peculiar opalescence.

Three diopsides from DeKalb, New York, two cut brilliant and one en cabochon.

One carbuncle from the province of Shantung in China.

One polished stone of rhodonite.

Two cut stones of labradorite.

Four sleeve button pieces of obsidian from the Yellowstone Park, two black, two of the mottled black and red variety.

The Jewelers' League.

President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
First Vice-President, WM. C. KIMBALL.....Of Strange & Bro.
Second Vice-President, AUG. KURTZBORN, Of L. Bauman Jewelry Co. St. Louis, Mo.
Third Vice-President, ROBERT A. JOHNSON.....Of Colby & Johnson.
Fourth Vice-President, JAMES P. SNOW.....Of G. & S. Owen & Co.
Secretary and Treasurer, WILLIAM L. SEXTON.....Of Sexton & Washburn.

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 JOSEPH B. BOWDEN.....Of J. B. Bowden & Co.
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 E. S. SMITH.....Of Smith & Knapp.
 WM. BARDEL.....Of Heller & Bardel.
 J. R. GREASON.....Of J. R. Greason & Co.

THE JEWELERS' CIRCULAR is the *exclusive* official paper of the Jewelers' League, and has been selected for the publication of all matters of interest pertaining thereto. Letters or inquiries pertinent to its business or purposes, and which might interest the trade or inquirers, will herein be answered. Address *Jewelers' League, Box 3,444, P. O., New York*, or the office of THE CIRCULAR.

At the meeting of the Executive Committee held November 5, there were present President Hayes, Vice-Presidents Johnson and Kimball, Chairman Howe, and Messrs. Greason, Bardel, Bowden and Sexton.

Eight (8) changes of beneficiaries were granted.

The Committee having in charge plans for the formation of a half rate membership and other important matters reported progress.

One (1) application was rejected and eight (8) referred.

The following were accepted:

Wm. H. Dutton, Huntington, W. Va.; Philip H. Lachicotte, Columbia, S. C.; Geo. W. Lord, Tilton, N. H.; Abraham Marquis, Philadelphia, Pa.; J. A. Mills, Little Rock, Ark.; William Nicholson, Brooklyn, N. Y.; Carl A. Nortz, New York City, N. Y.; Henry M. Ryder, Taunton, Mass.; Jas. W. Thornton, Richmond, Va.

Annual Dinner of the New York Jewelers' Association.



EVER since the organization of the New York Jewelers' Association, THE CIRCULAR has regularly published full reports of the annual dinners given, because as a representative association the affairs of the annual dinner are interesting to all persons in the jewelry trade. The twelfth annual dinner, held at Delmonico's, on Thursday, November 18, was one of the most interesting and enjoyable meetings ever given. The attendance has never been larger at any preceding meeting, and the speeches delivered after the wines and viands had been disposed of were of an entertaining and instructive

character. With scarcely an exception all the invited guests of the association assigned to toasts attended the dinner, and the number of speakers included some of the best after-dinner talkers that New York affords. It is to the credit of the association to know that men holding eminent positions at the bar, in the pulpit, and on the bench have attended these occasions from year to year, whenever invitations were extended to them, taking pleasure to sit at dinner with the jewelers and afterwards addressing them as a body of intelligent and representative citizens, such as compose the New York Jeweler's Association.

The members and invited guests assembled in the parlors from 6:30 to 7 o'clock P. M., and after an informal levee was held, as is customary, they marched into the banquet room in couples, where six long tables were spread with usual Delmonico elegance under glittering chandelier and flag decorations.

The president, George C. White, Jr., gracefully received the arriving guests, and devoted himself to their entertainment and comfort, and the committee of arrangements, assisted by Secretary Henry Olmstead, carefully and faithfully attended to the details of arrangements.

In the banquet hall opera airs were played during the evening by an orchestra in the gallery, and the scene of comfort and festivity which was presented attracted several visitors to the music gallery to view the banqueters. The floral decorations, cut flowers and set pieces that adorned the tables were from the establishment of Adolph Le Mout, and were especially provided for the occasion. On the walls American flags, supported by the national shield, interspersed flags of Great Britain and France.

The cuisine was excellent, and may be judged from the following menu :

| | | |
|-------------------------------------|------------------------|--------------------------------|
| MENU. | | |
| ----- | | |
| Huitres | | |
| <i>Potages</i> | | |
| Consommé Sévigné | | Bisque d'écrevisses |
| | <i>Hors d'œuvre</i> | |
| Céleri | Olives | Radis |
| Timbales à la Périgourdine | | |
| <i>Poisson</i> | | |
| Saumon à la Masséna | | Pommes de terre à la viennoise |
| <i>Relevé</i> | | |
| Filet de bœuf à la Clarendon | | |
| Choux de Bruxelles | | |
| <i>Entrées</i> | | |
| Dindonneaux à la Chevreuse | | |
| Petits pois à l'anglaise | | |
| Ris de veau en caisse à la Grammont | | |
| | | Haricots verts |
| ----- | | |
| SORBET CHAMPAGNE | | |
| ----- | | |
| <i>Roti</i> | | |
| Canvas-back | | |
| <i>Froid</i> | | |
| Terrine de foie-gras aux truffes | | Salade de laitue |
| <i>Entremets Sucrés</i> | | |
| Poires à la Ferrière aux cerises | | |
| Gelée orientale | | Gaufres à la crème |
| | Pièces montées | |
| | Glace fantaisie variée | |
| Fruits | Petits fours | Café |
| <i>Vins</i> | | |
| GRAVES | SHERRY PREMIERE | PONTET CANET |
| CORDON ROUGE | | POMMARD |
| LIQUERS | | |

Le 18 Novembre, 1886

DELMONICO'S.

At the table of honor where the president and guests of the asso-

ciation sat the gentlemen were seated in the following order as they faced the members and their friends on the main floor :

| |
|-------------------------------|
| Gen. Roger A. Pryor. |
| Gen. Horace Porter. |
| Hon. J. S. T. Stranahan. |
| Rev. W. F. Watkins D. D. |
| Chief-Justice Noah Davis. |
| George C. White, Jr., Pres't. |
| Judge John R. Brady. |
| Rev. C. C. Tiffany, D. D. |
| Hon. John Winslow. |
| Hon. R. B. Roosevelt. |
| Hon. Jackson S. Schultz. |
| Noah Brooks. |

The following is a list of the members of the association present with their guests :

LIST OF GUESTS.

Hon. Noah Davis, Hon. John R. Brady, Hon. Rob't. B. Roosevelt, Hon. J. S. T. Stranahan, Hon. John Winslow, Hon. Jackson S. Schultz, Gen. Roger A. Pryor, Gen. Horace Porter, Noah Brooks, Esq., of the *Newark Daily Advertiser*, Rev. Dr. C. C. Tiffany, Rev. Dr. W. F. Watkins, Seth W. Hale, Esq., President of the JEWELER'S CIRCULAR CO., H. Olmsted, Secretary of the Association.

LIST OF MEMBERS AND THEIR GUESTS.

Wm. R. Alling, John D. Alling, Henry Semken, H. S. Cozzens, Geo. Shotwell, W. H. Hennegen, Geo. W. Biggs, R. M. Hyde, A. T. Hubbard, Boyd Park, Alfred H. Smith, Harrison B. Smith, George Montague, Wm. H. Vogell, Chas. F. Greene, Jas. H. Hart, F. W. Sim, Geo. S. Wickham, Aaron Carter, Aug. K. Sloan, C. E. Hastings, Geo. R. Howe, W. T. Carter, J. S. Franklin, Geo. W. Banks, C. Weaver, Edwin Harris, Gen. Geo. H. Ford, D. H. Buell, Geo. B. Jaques, Rob't. C. Black, Col. Clifford Thomson, J. W. Senior, Steele Roberts, Chas. H. Solomon, Thos. G. Brown, Thos. B. Brown, Wm. A. Brown, C. L. Tiffany, Henry Tilden, Louis Lelong, L. C. Fairchild, C. G. Lewis, J. C. Mount, H. C. Ostrander, Geo. Warren, D. F. C. Forshay, John R. Greason, Walter N. Walker, Jas. P. Snow, A. W. Woodhull, D. L. Russell, O. M. Farrand, W. W. Wattles, E. Holbrook, W. C. Spencer, Geo. H. Houghton, W. M. LeCato, Geo. Wilkinson, Walter Wilkinson, A. B. Bray, Jas. T. Grogan, J. W. Beacham, A. Unkles, T. G. Moran, — Hesse, J. G. Bacon, Samuel Dodd, C. E. Breckenridge, H. B. Beach, E. G. Webster, F. H. Webster, Geo. W. Shiebler, Leon Barr, Steph. Avery, A. M. Crommelin, P. K. Hills, Jr., Chas. H. Fellows, N. H. White, J. Eugene Robert, Albert Wittnauer, Geo. A. Paillard, Chas. G. Alford, W. C. Kimball, Geo. Kremetz, J. A. Lebkuecher, F. S. Douglas, A. O. Headley, D. W. Crane, B. H. Knapp, H. D. Hotchkiss, L. S. Lewis, F. H. Mulford, Jas. C. Aikin, John B. Shea, L. E. A. de Goll, Isaac M. Miller, J. W. Miller, J. B. Bowden, M. L. Bowden, D. C. Dodd, A. F. Wise, F. D. Johnson, Jas. Hedges, Geo. A. French, M. B. Bryant, S. C. Scott, R. N. Peterson, Chauncey Ives, Hobart J. Park, H. B. Dominick, Alex. Dominick, L. B. Haff, Donald Mackay, W. L. Bigelow, W. H. Thurber, Isaac Mills, A. J. G. Hodenpyl, Geo. H. Hodenpyl, H. C. Hardy, H. E. Ide, John T. Howard, Nicholas Geoffroy, E. J. Scofield, Jos. Fahys, Frank Simmons, S. H. Monell, W. H. Atwater, C. M. Cram, Wm. E. Peck, F. E. Morgan, Walter Camp, Wm. L. Cooke.

After the dinner, when the cigars had been passed around, the president called the assemblage to order, and after reading the following letters of regret, the speeches of the evening began :

51 West 46th Street.

My dear MR. OLMSTED :

Accept my warm thanks for the cordial note and invitation to attend the Annual Dinner of the Jewelers' Association. I regret very much that my engagements and health will not permit me to accept. I have been as guest at many dinners of various societies in New York, but I never had a more enjoyable evening with a finer company of gentlemen, than I spent two years ago with the "Jewelers" at Delmonico's. The end of fine art is beauty. Long may the successors of the illustrious Benvenuto Cellini flourish—to improve the taste of mankind, and to adorn the world with the products of their genius and skill. I am always, cordially yours,

H. Olmsted, Esq., Secretary.

JOHN R. PAXTON.

NEW YORK, Nov. 9, 1886.

H. OLMSTED, ESQ., Secretary, 146 Broadway, City :

My dear Sir—I regard it as very unfortunate that the dinner of the New York Jewelers' Association is fixed for a night when I have a positive

engagement of long standing, otherwise it would give me very great pleasure to accept the invitation with which they have seen fit to honor me. As you know, I have heretofore enjoyed their hospitality, and it would give me much satisfaction to renew the friendly intercourse which I have had with your members, to whom I pray you to make my sincere thanks and respectful salutations. Very truly yours,
ABRAM S. HEWITT.

MERIDEN, CONN., Nov. 11, 1886.

H. OLMSTED, Secretary N. Y. Jewelers' Association:

My dear Sir—I am in receipt of your kind invitation to be the guest of the Association at its Annual Dinner at Delmonico's, on the 18th inst. I much regret to say that my engagements are such that I must be in Pennsylvania at that time, and I must therefore be excused from complying with your request.

I remember with keenest pleasure the last Annual Dinner of the Association when it was my good fortune to be present. If it were possible, I should like to renew the acquaintances then made, as well the enjoyment of the occasion. Very truly yours,
O. H. PLATT.

HARTFORD, CONN., Nov. 9, 1886.

Dear Sir—I sincerely and heartily thank you for your warm and complimentary invitation to attend the Annual Dinner of the New York Jewelers' Association, at Delmonico's, on the 18th inst. I should truly be glad to do so, but I am sorry to say, I have engagements next week in Central New York that it is my duty to keep, and they render it difficult and probably impossible for me to reach New York in time for the dinner. Regretfully declining, I again thank you and remain,

Respectfully yours, JOS. R. HAWLEY.

H. Olmsted, Esq., Sec'y N. Y. Jewelers' Association,
146 Broadway, N. Y.

16 W. 11TH STREET, Nov. 15, 1886.

My dear MR. OLMSTED:

I have just received your note of this date.

The New York Jewelers' Association have been so courteous to me in the past, and their anniversary dinners have been the occasion of so much pleasure, that I must express more than the conventional regret that I cannot be present at this, your 12th Annual Banquet.

I am under promise to attend a convention of an association to promote Industrial Education, next Thursday evening.

Nothing except a public matter like that would induce me to forego meeting with you.

Winter comes along with you—Winter with her Crystals and Pearls falling through the air, and her frosted dews outdoing all your silver tracery—Winter bedecking dead nature so as to rival Summer's beautiful life. Yes, Winter the King of Jewelers! May that cold king have his heart warmed and made kindly for the poor, by looking in upon the genial and good hearted jewelers whom I have the honor to know in your Association.

Sincerely your friend,
ALGERNON S. SULLIVAN.

It was noteworthy that no former president of the association presided more gracefully, and was more happy in his remarks while introducing the speakers than Mr. White, notwithstanding he is the youngest member the association has honored by electing to the presidency. His remarks were adorned with apt and pithy sayings and witty allusions, which elicited frequent applause. Mr. White first addressed the banqueters as follows:

ADDRESS OF GEORGE C. WHITE, JR.

Gentlemen:

It becomes my very pleasant duty to welcome you all to this dinner. Although privately and among ourselves, I assure you that rather than be caught in this place, boxed between two judges and without even a clergyman at my side, I think I would rather sit on the floor with the rest of the boys. But as I am here, I desire to say very much more than I can say. I have a beautiful speech prepared which I can deliver in two hours and a half, but unfortunately my voice is not at my command for that length of time.

There is no class of men who have a better right to be joyous in festive occasions like this, than the jewelers, for did it ever occur to you that our name "jeweler" comes from the old English word "jowele" and that word is derived from the old mother Latin, which signifies joy, or mirth. Hence therefore, jewelers are creators or promoters of that which makes joy or mirth, and therefore by name as well as by profession, they ought to be joyous and joyful themselves, because the highest aim in living is to make others happy, and if jewelers do not make others happy, who does? (Applause).

Now I may say for the benefit of some of our guests that while we are called the Jewelers Association, we are not only composed of the goldsmiths proper, but also of the silversmiths, and I might add, the artworkers in plate, and also the importers who, from all corners of the world, bring precious stones, pearls, and corals, and all the other articles that are akin to our craft. Yet for the sake of convenience we are called by one name, The New York Jewelers Association.

Now, you remember that when Cornelia was roughly bidden to bring forth her jewels, she pointed to her children. Did it ever occur to you how closely connected the jeweler is with all the joyful opportunities and occasions of life? When you are ready to be born, he meets you at the very threshold of life, and he makes you happy with a rattle. At your baptism you find the jeweler again with the christening cup and knife and fork and at every succeeding birthday, he is there. And as you grow up to man's estate, the jeweler is by your side, and when you hear that soft and sweet consent the jeweler is present with the circular gem which is an earnest of your vows. When you stand up with your betrothed to seal and consummate those vows, the best work of the jeweler's art, that plain circumferent band of pure gold, without beginning and without end, is the type of what your future happiness ought to be. [Loud Applause].

And so, as years pass on, through your silver weddings and your golden weddings, and perhaps your diamond weddings, the jeweler is always there to add lustre and brightness to your happiness.

The love of the beautiful is as old as the world. When Adam first opened his eyes and saw that beautiful creation so gorgeously decked, the glistening grass at his feet, and the beauties of the garden of Eden surrounding him, Adam's love of the beautiful was satisfied. Now the wise and great Creator never implanted a want in any human breast unless that want was supplied and could be satisfied. So we find throughout all history—and especially in that greatest of all historical works, the Bible—we find frequent mention of all the rare gems and all the precious metals that are lovely, not only for the adornment of man, but for the use and service of the temple. I might say that the jeweler was the first skilled artisan mentioned in that sacred history. I think if you remember, that Dr. Paxton some three years ago, alluded to the time when Moses was instructed to build the tabernacle, and he was called by God and informed that He had inspired Belzaleel, the son of Uri, the son of Hur, to be a cunning workman in brass, and silver and gold, and a setter of stones. So you see that while there may be some doubts of the apostolic succession of some of our brethren here, with the jewelers there can be none, for our craft is of Divine origin. We find that all the patriarchs of the Mosaic age had their jewelry, for when the children of Israel came out of bondage, they had jewelry enough to make a golden calf. And if you remember, Abraham found a wife for his son Isaac by fascinating her with jewelry. He sent a trusted servant to a far off country, who met Rebekah by a well, outside a city, and the servant then proceeded to unfold his errand. You can imagine that the maiden must have very slowly considered the singular proposition, but when he showed her a golden earring and two massive bracelets of gold, she became more interested, and when the two went together to the house of her father, then he displayed the splendid gifts he had for her, jewels of silver and jewels of gold, and other precious things. And she forthwith went with him without objection, and thus the jeweler's art secured Isaac his wife.

I could tell you a good deal about the first jeweler that came to America, and many other interesting things, but I am obliged for the reasons I have given, to postpone that for another auspicious occasion, and for the rest of the evening I shall simply act as the trigger to discharge these great guns on either side of me upon you. (Laughter and Applause).

The first toast in order, gentlemen, will be: "The President of the United States."

As you all know, our esteemed friend Mr. Chauncey M. Depew, has a peremptory and prior claim upon this toast. But very unexpectedly he was called out of town, and although we endeavored to get him here, we shall have to pass, him to-night. We will now drink the toast:

"The President of the United States."

The toast was drunk while the assembly stood.

On account of the very great silence that followed this toast, a gentleman on my right asked if there is a democrat in the room. (Laughter).

Now, gentlemen, the next toast is:

"Our Nation,"

and is to be answered by a gentleman well-known to you all, and

whom it is hardly necessary for me to introduce to you to-night, a gentleman who has seen both sides of the nation, so to speak, the southern side and the northern side. We have him as a northern man now, who knows no North, no South, no East, and no West—Gen. Roger A. Pryor.

ADDRESS OF GEN. ROGER A. PRYOR.

Mr. Chairman and Gentlemen of the New York Jewelers Association:

In candor I must own that twenty-five years ago I should have felt some embarrassment in responding to the sentiment you have delivered. For twenty-five years ago, we of the South did not regard this Union as a nation, but we believed it to be merely a confederacy of sovereign States, dissoluble at the will of any member. And in 1860 we essayed to put our theory into practice, and after four years of conflict and carnage, the Union emerged from the struggle unbroken and embued with the potency and plenitude of a nationality. And, gentlemen, we accept the result, not grudgingly, not as the arbitrament of the sword, which we are powerless to reverse, but from the conviction of our judgment and the impulse of our heart. The magnanimity of our government toward us at the close of the war, produced upon the people of the South a profound impression. Here was a rebellion which you believed without provocation, a rebellion which involved the sacrifice of countless millions of money, and hundred thousands of heroic lives, and yet, not a drop of rebel blood was exacted as an atonement and a propitiation. Nay, more, we who participated in the rebellion, we who precipitated the rebellion, we who defiantly retired from your capital to take up confederate arms, though you issued from the war in absolute triumph, we are now prominent in the councils of the government, and potential in your halls of justice. Still further, the leader of the Confederacy lives unmolested and is permitted to traverse the country, vindicating the validity of the lost cause, and I, a follower of him, am admitted to your hospitalty and enabled to repair the wreck of my broken fortunes. Gentlemen, in vain will you search the annals of history for a precedent, or a parallel to such national magnanimity. (Applause). True indeed, it is, that clemency no less than courage is the armament of true chivalry.

The view of the nature of our government which I intimated to you as prevalent among the people of the South before the war, was an inheritance of our forefathers, and was instilled into us by every instrumentality of educational discipline and instruction, but now with a larger experience behind us, and a broader horizon around us, we have come to the deliberate conviction that a government embodying the principle of secession, carries in its bosom a poison of inevitable dissolution and decay; and that a strong nationality is indispensable to the interest of domestic tranquility and safety.

To-day you will find no man in the South outside of a lunatic asylum who asserts the right of secession, and to-day if you will submit to the people of the South, whether they would retire into their Southern Confederacy, they will remain with you with even greater unanimity than that which characterized their attempted departure twenty-five years ago. (Applause).

As to slavery too—the characteristic institution of the South then—as to slavery, we had been taught to believe, and we did believe it to be a legitimate institution, but now we see that it was a moral, a political and an economical evil, and there is not a man in the South who would again bind with the fetters of slavery, the limbs of the negro. (Applause).

But, gentlemen, our attachment to the Union is not a sentiment only, we are also attached to the Union by cool calculations of self interest. We see that we are members now of the freest and the most enlightening government on earth. We see that the American Union offers the freest career for the pursuit of human happiness and human faculty. We belong to a government in which the individual is not eclipsed by the lustre of the diadem of the royal crown—a government in which is no religious encroachment on the precincts of conscience, a government in which is no military conscription, decimating the people and consuming the people; a government which we feel only in its protecting power. (Applause).

Mr. Chairman, with these feelings and these convictions, the people of the South have come back to stay. (Loud Applause). And if the integrity of the Union shall ever be menaced by peril they will be prompt to defend it with their lives. With these feelings and these convictions, I feel that I may respond to your sentiment, and with all my heart I will drink with you to the American nation; "May it grow ever and endure and be perpetual." (The toast was drank amid cheers).

THE PRESIDENT—We have with us to-night a truthful, honest, fisherman! I may say what has a fisherman to do with a jewelry man? Many years ago it was the custom to wed Venice to the

Adriatic, and at the time of the ceremony a ring was thrown into the sea to complete the union. Of course the ring was swallowed by a fish, and then the man who caught a fish containing a ring in its stomach received great honor and dignity. But many of these fish have never been caught and are still being fished for. The next toast is:

"The Empire State,"

which has been fished over from one end to the other by the Honorable Mr. R. B. Roosevelt who will respond to the toast.

ADDRESS OF R. B. ROOSEVELT.

Mr. President and Gentlemen of the New York Jewelers Association:

I listened with a great deal of pleasure to the opening remarks of your president in reference to the character, dignity and power of the jewelers' craft. I was fully in accord with him, for history tells us that we owe to the jewelers the existence of the State of New York. (Laughter). But history does not always tell the truth, in fact, like the incident that our president has been telling, history sometimes contains fish stories. But in this instance I am happy to inform you that history is more truthful than is the ordinary run of fish stories. Our great forefathers, our great-grand forefathers came over here in ancient times and discovered this country waiting for our possession—found it in the possession of a lot of Indians, and it was then their duty to get it from those Indians as soon and as rapidly as possible. It has been said by those wretched people who always destroy the beauties of history, that most of the stories of ancient times are myths, and that even Christopher Columbus was a buccaneer; that he came over here in pursuit of gold. But undoubtedly, the gentlemen who came over and settled in New York State were highly respected and intensely honest. In their magnitude, in their extravagance, in their generosity, in their appreciation of this great State, they were willing to pay for it in the sum of twenty-five dollars, in the shape of trinkets. The existence of New York State, let me tell you, is altogether due to the jewelers of the seventeenth century, without whose cheap goods the Dutch could never have secured Manhattan Island. One of the pieces of that jewelry was a Waterbury silver plated watch, a *piece de resistance*, which it took the worthy sachem of the tribe all the afternoon to wind up. Whenever that watch got out of order, the sachem got out of humor, and unless the watch ran, he was bound to take scalps, and I assure you in those days it was a boon to any settler if he belonged to the Jewelers' Association, and knew how to put the Waterbury watch in order. (Laughter). So you see if it had not been for the jewelers and their capacity for producing an unlimited quantity of glass beads for the small sum stated, we never would have had the State of New York, and without the State of New York, we never could have had the city of New York, and we never would have had the United States. (Laughter).

That nationality across the sea, Holland, by their perseverance and ambition conquered all Europe, profited by adopting the improvements of sister nations, and so it became that every good thing and great thing, coming as it did from Holland, the Dutch settled here, and from here spread over all the broad land of the United States. But, Mr. President, I am not now addressing the Holland Society, and I must close my remarks.

THE PRESIDENT—I am sure that there are very few of us here that knew before that this island on which we live was bought by jewelry, and if that is so, it is a great compliment to the jewelers of that day.

Gentlemen, I wish you to fill your glasses and drink to the health of our esteemed and honored craftsman, Charles L. Tiffany.

Mr. Tiffany, who occupied one of the seats of honor at a table on the main floor, responded briefly and in fitting language to the compliment.

THE PRESIDENT—May it please your honors and gentlemen of the jury, the next indictment is a large one; it is against a great metropolis. The gentleman who is to argue this case for the defendant is one who is no stranger to you, and he will be apt to make it as good a case as possible for

"The Metropolis."

We will now listen to what Gen. Horace Porter has to say. (Cheers for "Porter.")

ADDRESS OF GEN. HORACE K. PORTER.

Mr. President and Gentlemen of the New York Jewelers' Association:

Sometimes a man does not realize until he gets on his feet how really

barren he is of ideas. I am afraid I might find myself to-night in the condition of an ambitious lieutenant who came down during the war and was assigned to the staff of a commanding general. He had on a uniform which was brand new, and in all respects gave indications of army inexperience. Soon after his arrival the general told him that there was about to be a charge, and, said he, "When I give the command for the charge, I want you to take the exact time." The young man said, with that self-confidence which emanates from youth, that he would. The charge began and the commanding officer said "now," and the young man promptly pulled out his watch and informed the commanding general that it had run down. (Laughter). It may have been, perhaps, that same old Waterbury referred to by Mr. Roosevelt. That general learned that watches are made to stop, and so it is with a speaker, for a man does not realize until he gets on his feet that he is run down. You know the old saying that speech is silver but silence is golden. In this connection it seems to me, that the more silver you work up the less there will be for the government to use; and I want to encourage the silversmiths to make more plate ware, for then we will have less of the "dollars of our daddies," which we have to take with four hundred odd grains of silver and several more of trust.

The only time that I wish that I belonged to this trade is when I go with my family to buy silver, and then I wish that I belonged to the trade that I might get goods at the cost price, and save that profit which, I understand, is 90 per cent. to members of the trade.

I listened to your presiding officer when he said that the jeweler was on hand from the first woman to the last woman, and yet doubted the remark when I remembered that when Eve appeared to Adam she had not even a silver ring on her. The only mirror even that she had was a crystal stream and if she had any female modesty she would not have looked into that. (Laughter).

But to continue with regard to the great metropolis. (Laughter). My experience has taught me, in listening to the speakers here to-night, that they seem to have a fear that the gentleman who, in a moment of courageous recklessness, alludes in the slightest degree to his toast will trespass on dangerous grounds.

To get an understanding of the metropolis we must go back to the aborigines when they bought this State for twenty-five dollars, as our friend has told us. Those aborigines did not dress quite so much as the present inhabitants. That was, no doubt, owing to the fact that Anthony Comstock was not present then. Then the Dutch came over and they improved on the style of the dress, in the shortness of their breeches and the length of their pipes. But those Dutchmen were a shrewd lot. When the Dutchmen took the savages into the forest to point out to the untutored savages the better land above, he instructed him at the same time in the wiles of the devil, and quietly dealt himself four aces from the bottom of the pack. These men came from the metropolis abroad—from Amsterdam and Rotterdam and other dams, and settled in the vicinity of Macomb's Dam, and succeeded in establishing the damnest government. (Laughter). You may not have heard of the young lady of the metropolis who went abroad and, like many young ladies, became after a while more English than American. While in the company of Bret Harte, one day, she began comparing Great Britain with America, and the two cities New York and London. She said there was nothing so sentimental in the vicinity of New York as in the vicinity of London. Sentiment pervaded the surroundings of London. She, for instance, was staying in a beautiful place called the Earl's Oath, near London, and she was sure there was no place in the vicinity of New York like it. "Well," said Bret Harte, "I don't know about that; we have Macomb's Dam here." (Laughter).

Now we have the ornamental statue of Liberty erected in the gates of our harbor, and this metropolis will not be gilded by the light of setting suns only, but in its progress it will be lighted by the lights of rising sons; and I do not know of any guild that has done more to establish its reputation, inside and outside of its own borders, than yours. If printing has been called the art preservative of arts, yours should be called the art commemorative of arts, for all the people look to you for their ornaments, from the precious treasures of royalty down to the simple wedding present that encircles the finger of the peasant. When a young man was asked in Sunday school where did Solomon get all the jewels of his temple, he replied: "At Tiffany's." I listened to your president when he said that Cornelia held up her children as her jewels, and I felt that so, also, will the metropolis always point to you and say: "These are my jewelers." (Applause).

The Chairman, introducing J. S. T. Stranahan, said: I am happy to say that we have with us to-night a gentleman who has

seen Brooklyn grow up from a village to a city of over 800,000 people; a gentleman whose mind conceived and whose hand has practically carried out not only the great park which is the gift of Brooklyn to her people, but who was actively interested in the building of the great Brooklyn bridge, and when you cross the bridge you can find his name upon the enduring bronze tablet. I will introduce the Honorable J. S. T. Stranahan.

ADDRESS OF HON. J. S. T. STRANAHAN.

Mr. Chairman and Gentlemen of the New York Jewelers' Association:

In responding to the toast "Our Sister Cities," I will forego the pleasure of reminding you of the rapid growth, the great wealth and the power of the two municipalities, and content myself with a brief word touching the question of their union. This is an old idea of mine, and one greatly strengthened by the completion of the bridge. Annexation is a common desire on the part of the people of all the country. It is idle to say that our people are exceptional in that respect. Indeed, it would be quite correct to say that the people of the United States claim a patent on the term annexation and all that the word implies. In respect to the union of New York and Brooklyn, you will bear in mind that the Thames flows through the center of London and the Seine through the heart of Paris, and in neither case are there two cities on the opposite banks. It is London on both sides of the Thames, and Paris on both sides of the Seine. The corporate unity is not dissevered by either river. The population on neither side would be benefitted by being split up. Here, however, we have our New York city and our Brooklyn with our East River rolling between them. They are distinct cities and separated by a high waterway. Is this distinction any advantage to either? Would consolidation of these two cities into one corporation be any harm to either? The people are the same people and have common commercial and social interests, and one municipality would serve them quite as well as two. There is no practical reason why this distinction should continue. There is the fact that it exists and no good reason why it should exist at all. One municipality would be far less expensive, and, with good business judgment and wise judicious administration, one city would be equally as effective as two. There is no reason why there should be two cities and two sets of city officials. The protection which cities get from their different officials lies in the details of the work that is done by the subordinates. I may be mistaken, but I think that the public sentiment of New York and Brooklyn would cordially welcome a consolidation of the two cities, and neither would ever seek a divorce. It may be that the present generation may never see it, but come it must. Every indication points to it as an inevitable issue at one time or another. Many of us remember the geographical maps that formerly pictured to us London as a city of 1,000,000 inhabitants. Now it has more than 4,000,000, and the same will be true of the rapid growth of New York and Brooklyn. The child born to-day will live to see a population of 5,000,000 on both sides of the East River, and the two cities united in corporate unity. (Applause).

THE PRESIDENT—The next toast, gentlemen, is here, but the gentleman to reply is outside. Judge Brady has been called. I would say that the toast is the "Judiciary," and is to be responded to by him.

Mr. Alfred H. Smith, who sat in the back part of the room, said in behalf of Judge Brady, that on account of the death of his old friend, ex-President Arthur, he asked to be excused from making any remarks.

THE PRESIDENT—The next toast,

"The Clergy,"

will be responded to by the Rev. C. C. Tiffany, D.D.

ADDRESS OF REV. C. C. TIFFANY, D.D.

I am very sorry, Mr. President and gentlemen, that the invitation that I was to respond to the clergy came so briefly before the feast that I was unable to prepare for it. When I was told that I was to respond to the toast I began to think why I was selected. I concluded that it must be this: That somehow or other the President must have heard that some twenty-five years ago my ancestors settled in the town of Attleboro, Mass., which is celebrated in the annals of jewelry. But then I said why should you want the clergy represented at a jewelers' dinner; they are not valuable customers of yours. When the clergy go through Union Square they walk on the opposite side from the jewelry establishments. We have been told how the jewelers with their accustomed magnanimity rush into all the feasts of the church, baptism and the various weddings that occur, but I am not so sure that they are so attentive to all the fasts of the church, and consequently I thought

perhaps I might say a few words to those who are not accustomed to hear the voice of the clergy. (Laughter). But I felt sure if I asked the gentlemen present to tell me what I should speak about, they might say as the good bishop said when he was asked by the young clergyman what he should preach about, "Why, my young friend," said he, "preach about five minutes." (Laughter).

I can see though that there seems to be an analogy between the jeweler and the clergyman. The jeweler's duty is to take precious material and make it more precious. He gathers the precious stones where they may be found and adds to them new value by infusing into them human thought, and out of crude material there comes the jewel which shines a brilliant ornament in all departments of life. The jewelers' art ennoble that which it touches. You have achieved the impossible, in that you have made fine art out of crude decoration. Therefore you are hailed as the advancers of civilization, in that you refine the community. There are great uses for your work, and when one speaks of it in relation to the church, he knows how much the jewelers have done for the glorifying of the earthly temples. It is the same task in a different sphere that comes to the clergyman. He, by the infusion of the divine thought, raises humanity out of the crude state and lifts it to the realm of the saints, and therefore it seems to me proper that a clergyman might speak here to-night, because he feels that below all the superficial difference in the two professions there is an underlying resemblance. You are engaged in some of the noblest works of the Creator by the application of human thought and human feeling. (Applause).

We have been told by the last speaker of the marriage of New York city and Brooklyn. If that marriage is ever consummated, stout churchman as I am, I hope it will never be consummated by the intervention of a "ring." (Laughter). I hope if it ever takes place it will be a marriage of affection and not merely of the attraction of riches. (Applause).

THE PRESIDENT—It would seem to be a superfluity for me to introduce the next speaker to you. For we all recognize in Judge Davis the God-father of this association—who, by his words of council and admonition, advice and reproof, has made many of you think before you wrote on your invoice "stamped 14 karat by request." (Laughter).

Judge Davis responded to the toast, "The Question of the Hour," as follows :

ADDRESS OF JUDGE NOAH DAVIS.

After Dr. Tiffany's brilliant flash of silence, I feel that a little plain talk will not be out of place. It is true, I believe, that I have attended most, if not all, of your annual festivities. Still I have no right to be called your God-father. If your president chooses to adopt me in that capacity however, I shall look upon it as an honor, for nobody would celebrate his annual birth without calling in his God-father to the festivities. I was delighted to listen to the speech of General Pryor, who spoke to the toast of "The Nation" in tones of such eloquent patriotism, as perhaps no man can speak, who has not himself participated on one side or the other of that great struggle which cemented our national fabric forever. (Applause). I was glad, also, to hear from Mr. Stranahan on the subject of the union of the two great cities, for I think it is but perfect justice since Brooklyn took New York out by the way of the bridge, that she should be taken in. (Laughter).

I have a train of thoughts to lay before you to-night, and I shall condense them as much as possible, but I wish to talk about the most important question of the hour. Our government, as already has been stated in most eloquent terms to-night, by the greatest civil war, has established results so that it is to-day the freest, the strongest, the most powerful of all the governments of earth. Under our present constitution as it has been brought out from the crucible of that bloody war, all men in their rights of person, of property, and of conscience, are equally protected under its overshadowing panoply of power. These questions as settled by our fathers in the origin of the government, as finally cemented and established by the war, has given us a good government. But not the fear of secession, but new difficulties are now rising before us—questions which we are compelled by necessity to meet and determine aright, if we are to preserve that government. We must as citizens of America, remember now and in the future, that the constitution and government of the United States was framed for America and Americans, and not for any other portion of the world. (Applause).

The people of no other land have any right to claim the rights and privileges that it secures to citizens of America except with our consent, and their own conformity by adopting and assenting to the laws and institutions of our country. It is for us to say whether the inhabitants of China

may become citizens of the United States and entitled to the privileges that we possess. It is for us to say whether any of the races so unsteady in their habits and modes of life can claim the protection of our constitution and our laws which are not for them, but for ourselves, and it is for us to say whether there shall be introduced into this country from any portion of the world, elements of anarchy and socialism that shall destroy the institutions that our fathers gave us. We have opened broad the gates of our harbor; we have heretofore bidden all mankind to come to us. But the time has come when it is important for us to say how far we shall receive these men. We should not encourage ideas that strike at liberty as founded upon law, and substitute in its place an anarchy which is destructive of liberty. By the few words that I have uttered to-night, I wish to show the importance that the people of this country—men of thought, men of intelligence, men who comprehend that liberty cannot exist unless it is supported by law, and that no man's rights are secure when liberty is perverted—I say it is for us, such citizens as you, who have grown up under the blessed institutions of our own government—for us to say how far we shall allow the introduction of these false ideas which strike at the very foundation of law. (Applause). Heretofore we have made our country the asylum of the oppressed. I am not against its continuance in that character. Let the oppressed seek our land from every country where religious or political persecution exists. Let them seek it where man is deprived of the opportunity of showing the manhood that God has implanted in his heart. But let them understand that here they must fully accept, live under and sustain the constitution and the laws of our country in that spirit and understanding which you and I accept. (Applause). It is high time, my fellow citizens, that we take strong ground upon that question. Shall we allow anarchy to overthrow the laws of our country? Shall we allow false ideas of socialism to break down those laws which have enabled the humblest boys of the United States to aspire to its highest honors? Shall we suffer a system to be disturbed which called such a man as Abraham Lincoln (applause), from the humblest relations of life, from the poorest of poor conditions, to become second to none in the ranks of men in this country? A man toiling on the tow-path was enabled under these laws to become President of the United States. President Garfield was enabled to rise from such a low estate to the presidency under our laws of liberty and enlightenment. We will give similar privileges to any foreigner who comes in our midst and accepts with honest heart the form of our government. But we will not have these rank officious fellows, these theorists, attempt to assert doctrines that would destroy you and all of us in our rights of property and in our opportunities of advancement—that would take from offspring property chances to attain wealth, that would prevent such men as myself, if I may be excused for making the illustration, from rising from the depths of poverty by the education of the common school and from standing in such a place as this and talking to you. God forbid that we should not seize upon the remedy that will prevent this, by enforcing the law, by maintaining the dignity and power of the government, and by sustaining the constitution, which to-day still bears the mighty genius of Hamilton and the glorious doctrines of freedom. (Loud applause and three cheers given for Judge Davis).

The president then called on Noah Brooks to respond to the toast :

"Art, Literature and Science ; The three Graces that adorn our lives and make them useful."

ADDRESS OF NOAH BROOKS, ESQ.

Mr. President and Gentlemen of the New York Jewelers' Association :

I don't know that I have ever had a larger contract assigned to me than to defend Literature, Art and Science. I remember a man in my native State who was asked by his father : "Jimmy, do you think that the hen will hatch out all those eggs?" replied, "No, father, but I would just like to see her spread herself." And it occurs to me that this is what you want me to do to-night. Pope says in one of his poems : "So comes the reckoning when the banquet is o'er—the dreadful reckoning when we smile no more." Gentlemen, my reckoning has come in a speech which should cover Science, Literature and Art. It is now late, and should I say what I know of science, literature and art, it would be very much later. But if I were asked to speak for literature, I should probably say that a newspaper man knows very little about literature. True, there are literary men who are newspaper men. There are journalists who are also literary men. So you jewelry men are sometimes artisans and sometimes artists, but rarely. (Laughter). The commercial point of view is always held in distinction by you and by journalists, and I don't believe that any jeweler would waste his energies on a jewel which won't sell, nor would any journalist waste his time on a paper which does not circulate. No self-respecting newspaper man ever considers

literature or other principles superior to the counting room. I say this as one who has had experience (laughter), and who, to use a vulgar phrase, has been there. If I were asked to speak for literature, pure and simple, I should not speak cheerfully, because journalism, as I have said before, is not literature. Now, we all of us respect the fathers of literature, Chaucer, Washington Irving, Adam Smith and Charles Lamb, but we never read their works. We are more familiar with the periodicals than we are with the patriarchs that made literature. Nevertheless it is very commendable to speak of literature as a thing apart by itself, as we all speak of honesty as an abstract principle. So literature in the abstract is a very admirable thing, and we are glad that there is such a thing as American literature. But when it comes down to hard pan, to solid views, we would rather have a two-cent newspaper than all the libraries the world has produced.

But looking over this delectable and worthy company of jewelers, I have said to myself: They have come out of the past with all their traditions. The jewels! the joyous things of life! they bring with them all that is good and worthy in man. Now, I do not say this as a matter of compliment and to pay for my dinner. And when my friend, Judge Davis, once said that he never had a jeweler before him as a subject for correctional discipline, it seemed to me that right there he touched upon the marrow of the subject, because jewelers and goldsmiths and silversmiths are nothing unless they are genuine. There are lapidaries who were known in ancient jewelry that are not those who, in our later days, are identified with Attleboro, Waterbury and Meriden. They were men who were genuine. Now, genuine plate is one thing, and genuine gold is another. Genuine silver, genuine gold, genuine diamonds, are all real to us, and when we, who are merely your improvident customers and who look upon you as the benefactors of the race for furnishing to us standards of value—when we come to you, we come with all trustworthiness. When I go to a jewelry establishment, for instance, I say, "I don't know anything about diamonds," and while I always get what I pay for, it is with implicit trust that I make the purchase. And I do not know—I say this with all candor and sincerity—I do not know of any profession that requires so much confidence between man and man as yours. I know nothing about the value of such things, and we therefore put ourselves in your hands and trust you. Thus is displayed real, honest, sincere manhood. It is confidence in humanity. I have often thought, in looking over the whole field of humanity that the brightest diamond in life is sincerity. You will see it scattered all through art—sincerity and honesty representing types of nobility and excellence. I remember when I stood at a window of the White House during the war, with Abraham Lincoln at my side, and he said: "Did you ever think what the Chinese call our flag?" said he; "they call it the flower flag." "Well," I said, "Mr. President, the flower flag is a very good name." Said he: "The Chinese call it the flower flag because of the harmony of the stars and stripes." And it immediately occurred to me that there was something in the flag that was not only like the flower, but was like the gem. The red is the ruby, the white is the opal, and the blue is the sapphire. I mentioned the thought to the President, and he liked the idea. And so when I look at the stars and the stripes, and remember that conversation with the dear old man, I think of the gems that make the stars and stripes, and remember how he quoted from those beautiful lines: "When some wanderer, lonely and friendless, in foreign harbors, shall behold that flag unrolled, it shall be to him a hand stretched forth from his native land, filling his heart with love."

The President, in stating the next toast,

"New England,"

said: When the *Mayflower* sailed back across the Atlantic she left behind her the *Puritan*, *Priscilla* and the other *Gal-at-tea*, and also the *first American jeweler*. The latter at once slit up clam shells, strung them with beads and traded his production with the untutored Indian for land; he then went through New England sowing the seed from whence has sprung up the extensive and magnificent watch and clock factories, silver and plated ware works, and jewelers innumerable that now dot her hills and valleys.

A few years ago all good New Englanders living in Brooklyn, besides furnishing to the New England Society in New York their best speakers, had to trudge home through the deep snow with their "heavy guns," after hearing them boom so far away from home.

The wise men got out their almanacs, consulted the log of the *Mayflower* and the hotel register of Plymouth, and ascertained that the Brooklyn passengers landed *one day ahead* of the New Yorkers!!

Hence it is we have our New England dinner in Brooklyn the day before the New York affair.

We have with us a lineal descendant of that Brooklyn contingent and I am happy to present to you the President of the New England Society of Brooklyn, the Hon. John Winslow.

Mr. Winslow responded to the toast as follows:

ADDRESS OF HON. JOHN WINSLOW.

Mr. President and Gentlemen of the New York Jewelers' Association:

When Saint Paul said that evil communications corrupt good manners that was equal to saying it is a good thing to be in good company, so I have taken his advice and am with you here. I do not know any thing about the jewelry business but I know I have been reasonably well taken in at times. (Laughter). I am not going to talk about the jewelry business, but I must remark in connection with New England, that one of the very first things that the pilgrim fathers did was to discover the precious stone, the Plymouth rock, that rock which has been gleaming ever since in the sympathies and the memories of the people of New England. So after all, there is a bond of sympathy between the pilgrim fathers and the New York Jewelers' Association—for they both are fond of precious stones.

One of the peculiar traits of New England people is that they have always shown their great faith in education. Harvard was founded among the Indians years ago, and the result has been the up building of the leading university in the land. At the same time, I think that the habit of culture and education in New England sometimes goes too far. For I know of a judge in Massachusetts who graduated from Harvard, who had a habit of appearing never to be able to answer a question put to him by any of his neighbors. One day two farmers called upon him and asked what kind of an apple it was that captured Adam and Eve. The judge replied that it was undoubtedly a "fall" pippin. That answer was worthy of New England culture. Whenever you hear of a great railroad or canal building, you can be sure that there is a New Englander in it or behind it. And then the New Englander, and especially that kind, likes to see the dividend coming and always has his eyes open for such a thing. But it is not the occasion for me to go over the virtues of New England. It is late in the evening and it would be much later after I finished if I should attempt it. At the same time we have a right to remember that New England has contributed much to this nationality. If you look into the field of poetry you will see that we have produced some of the ablest men; for instance, Emerson, Longfellow, Lowell, Holmes, and a host of others; and if you look into the list of jurists you will find the names of Mason, Choate and Sumner, and if you look into the list of statesmen there is one name that overshadows all else in the country, Daniel Webster, and so we are not ashamed of New England—we are proud of it—and I am inclined to think if an inventory were taken of the successful jewelers here to-night, we would find a majority of New England men. (Applause).

I was very much interested in what Judge Davis said about the evil spirit of the times, the question of the hour, and I may say that if the storm does come you will find no where in the country, men who will stand by the constitution more heartily than the yeomanry of New England. (Applause).

THE PRESIDENT—"The Morals of Trade" is the next toast, and the gentleman who will instruct you in that is one that is well fitted for the work, the Rev. Dr. Watkins.

ADDRESS OF REV. W. F. WATKINS, D.D.

Mr. President and Gentlemen of the New York Jewelers' Association:

I have never been called upon I think to speak on any subject at so late an hour as that which my watch indicates. A friend of mine, a clergyman, who was called some years ago to the principal city of one of our neighboring States, after he had been with them some time became impressed with the inhospitality of the people. On one occasion when he was making a call he was informed by the servant that the family was out to dinner that evening. "Why," said he, "I never knew they ever went out to dinner here." But my experience with the New York Jewelers' Association has been very different. This is the second time that I have been invited here to attend your dinners, and I was easily induced to be here the second time. I think your committee showed better taste than the people of Father Prot, who was led to preach a charity sermon from the text: "He that giveth to the poor lendeth to the Lord." And he went on to say: "Now, some of ye may be asking who is meant by the poor; and perhaps ye will be saying it must be the widow Flaherty who lives down the lane with six fatherless children, and some of ye will perhaps be thinking it means old Jimmie Maloney who lost his leg in the service of his country." But I will tell ye

who it means—it means the clergy. (Laughter). I came across a lot of ye, merry, drinking and eating the other day, and yet ye forgot all about me and did not invite me to join you." I can only say, Mr. Chairman, that that sort of charity does not exist with the Jewelers' Association.

But in regard to my toast: I am certain that if some of the things that I have heard—if I should speak them out, there might not continue this flow of geniality. A member of a church, presided over by a certain colored preacher, who was employed in my family, informed me one day that the minister was not getting on as well as his predecessor. "Why," said he, "this minister talks too much about the Ten Commandments, and last Sunday night he preached a very uncomfortable sermon on the Eighth Commandment, 'Thou shalt not steal.' Why, if he continues he will ruin the cause." And I fear the same thing if I should continue with the topic you have assigned to me to-night. (Laughter). But I am glad to know there are certain men who will not indulge in the practices common to others. I do not know whether you are accustomed in your craft to mix things. To adulterate and mix ingredients is not necessarily fraudulent, but to pass off on an unsuspecting customer an article which improperly bears another name is not right. I do not know if a thing of that sort has ever occurred with the craft which is represented here. (Laughter and cries of "Oh, no.") No, I suppose not. We sometimes hear about a statement of profits. A lie spoken over the counter is not the less equivocal. But why do we hear about sales at reduced rates and enormous sacrifices to get rid of stocks. Such things have occurred, but I suppose have never occurred with you. (Renewed laughter). Then I have heard young men say that they are compelled to resort to devices which are not honest or right, but which their employers exact. It is very foolish for employers to teach their employees to do this, for the young man so taught may turn his learning upon his employer and cheat him. (Applause). Then, again, I am told that such things as these occur: That when customers from the rural districts visit the metropolis, employers do instruct their young men to go about town and show the sights to the strangers. I suppose such things never occur in connection with the business of the Jewelers' Association. ("No! No!")

But, gentlemen, these things aside—and you agree with me that I have not avoided altogether the text that you have assigned—I have a very sincere sympathy with the business man in these days of competition. It is a great thing for a business man—honorable, responsible, worthy—such who has been faithful to his conscience in the hour of trial and temptation as well as in time of prosperity—it is a great thing for such a business man to pass through years of active business competition, honest—without a smell of dishonesty and without the faintest touch of pitch on his hands. Gentlemen, there is something better than merely seeking to make money, and that is to have a character—character which is better than silver and gold and more precious than rubies; and the business man who goes through the discipline of trade and comes out of it with the conditions that I have just indicated, is sure in the eventide of life to enjoy comfort from an easy conscience as a golden benediction. I wish for you all such a conscience and such a benediction. (Applause).

THE PRESIDENT—The last toast, but not the least, was one which was put down for a much earlier period in the evening, and that toast is:

"Agriculture, Manufacture and Commerce; the Bulwarks of the Nation."

The gentleman who was asked to respond to this requested that he should be last. Let me introduce the Hon. Jackson S. Schultz:

ADDRESS OF HON. JACKSON S. SCHULTZ.

Mr. President and Gentlemen of the New York Jewelers' Association:

Ten days ago I received and accepted an invitation to occupy a seat at this table, because I thought it would give me an opportunity to deliver an address contrasting the olden-time Benvenuto on Broadway with the present Tiffany on Union Square. Some of the older men here will remember that Benvenuto lived as long ago as 1832, and I proposed to speak about the jewelry business in those times. But after preparing my paper I was compelled to take up, by direction of your president, Agriculture, Manufacture and Commerce. Now, gentlemen, when that big subject was presented to me I thought I would bring it down to a simple proposition: America as men who "catch on"—Yankees who catch on to things. Some of you will remember that you are indebted to some of us for leather goods in use that had to be entirely imported a few years ago, but which we are now manufacturing. The Russian leather goods that were formerly imported are now manufactured in the United States, and you owe this to Yankee

ideas, and largely to a jeweler who is present here to-night. I say, the American manufacture of these goods is largely due to that man. Mr. Tiffany will remember in 1873 a conversation that he had with the speaker, and the manufacture of Vienna goods here has been due to the outcome of that conversation. The American ability to "catch on" has contributed to the great progress of this country. You will remember that in 1876 a style of art was introduced in Philadelphia from abroad by a gentleman, which soon spread over the whole country. The same thing occurred in England when she went to France with her industries, and she brought back to England all the artistic decorations of France. That change referred to which has come to us, has come through a single decoration which Owen brought to Philadelphia in the shape of a cottage in 1876. Americans have a singular faculty of catching on to any idea that comes along. I happen to know something that occurred in Vienna in 1873, in the direction of the appreciation of our ideas by foreigners. We took over there some clothes-pins to the Exhibition there that year. They lay in boxes for a long time. People looked at them and knew there was something in those clothes-pins that was important, because they came from America. So, finally, the Commissioners stretched lines across the rooms and hung clothes upon them, to show the use of the pins. The people looked at them and said: "It ees wonderful." And so ever since loads of clothes-pins go to Europe every year. The whole of Southern Europe are looking to America for ideas. They know that you "catch on" to living thoughts, and they are watching to profit by your ideas. Any man to-day, who will go to Southern Europe with Yankee notions, will make his fortune. (Applause).

PRESIDENT WHITE—Now, gentlemen, this concludes our business, and as many of you as are in favor of adjourning to meet here one year from to-day will say "Aye."

The "Ayes" were unanimous, and the company adjourned to the coat-room.

The Ring.

O blythesome ring, O winsome ring,
That Willie gied to me,
As down thy glen, dear Monymore,
We wandered to the sea.
For we had come by Drumodune,
The rills o' Toranree,
That croon among the green breckan
And the blaeberry.

And saft and couthie were the words
He coo'd into my ear,
Like wafts o' heavenly wind that blaw
When nane but love can hear.
And sweet and sweeter grew the kiss
For miles he gied to me,
As we gaed through the green breckan
And the blaeberry.

Then in the Glen o' Monymore,
Where the brown waters sing,
He took my hand and fondly bound
My finger wi' a ring.
O bonnie ring, O faithful ring,
O ring that trusted me,
As we gaed through the green breckan
And the blaeberry.

I wear the ring, my Willie's ring;
It clasps me like his arms;
His heart beats in it warm and sweet,
And keeps my life frae harms.
And still it shines, and sae I ken
That he'll come hame to me.
And kiss me 'mong the green breckan
And the blaeberry.

—William Freeland.

Foreign Gossip.

INFORMATION.—The United States imported \$10,000,000 worth of diamonds and jewelry during 1885.

DEATH.—Another celebrated watchmaker of the Glashütte School of Horology, Julius Assman, a co-worker of Moritz Grossmann, died on August 15, at Glashütte, Saxony, in the 59th year of his age.

TIME FIXED.—The Committee of Ways and Means of the Convention of the Austrian watchmakers have fixed the time of the Convention to be October 9, 10 and 11, and the place of meeting to be Vienna, Austria.

ANOTHER AUSTRALIAN EXPOSITION.—An international exposition will be held at Adelaide, Southern Australia, next year. The Government of the Cape Colonies has announced its intention of sending specimens of the productions of the country.

SLANG FRENCH.—It is a curious fact that in the slang or *argot* of Paris, the word *bijoutier*, which really means a jeweler, is used to designate the industrial who buys scraps from the kitchens of the big restaurants, and retails them in the popular markets.

THE "BARON OF THE DIAMOND MINES."—A South African exchange says that "the Baron of the South African diamond mines," Mr. A. A. Rothschild, has left Kimberley for several months to visit Europe and seek to restore his health. A residence of sixteen years at the Cape is calculated to shatter the health of any European.

CAST-GLASS.—Frederic Siemens, of Dresden, has succeeded in casting glass in the same way as metal is cast, thereby obtaining an article corresponding to cast metal. The hardness and resisting power of this cast-glass are so great that experiments are being at present carried out at the Siemens Glass Foundry, at Dresden, for the purpose of ascertaining whether the material might be employed for rails on railways.

PRODUCTION OF DIAMOND MINES.—The "Association for the Protection of the Mines" of the Cape has issued its report, and from it we learn that the Kimberley, De Beer's, Dutoitspan, and Bultfontein produced, during the month of June, respectively, 60,253; 57,269; 55,903 and 44,910 karats of diamonds, or a total of 218,336 karats, of a value respectively of £54,484; 49,544; 71,313 and 12,355, or a total of £217,648.

DISTRIBUTION OF PRIZES.—The double number for July and August of the *Revue Chronométrique* is filled with the proceedings of the distributions of awards, at the Palace of the Trocadero, to the scholars of the Paris School of Watch Making. This school, now a most important concern, was founded in 1880, and received recognition and a legal establishment from the French Government for three years later. Since this date, some 119 scholars have received technical instruction in the art of watch making.

THE BRITISH WATCH TRADE.—A correspondent of one of our English exchanges gives a doleful account of the British watch trade in general, and in speaking of the head center of the watch business, Coventry, London, he says: Coventry watchmakers are in an apparently hopeless state of despondency, although I hear of two houses having received a new lease of life. Let us hope they will become more general; there is no doubt about their scarcity, and many manufacturers here are in great straits. Cheap goods, as worthless as cheap, continue to rule the market; presently the apparently natural gullibility of John Bull will cease in this respect, and a return of discretion will arrive when he has discovered the folly of purchasing stop-gap articles instead of life timers.

THE PARIS SCHOOL OF WATCH MAKING.—It has been decided to erect a large new building for the accommodation of the Paris School of Horology, which, during the few years of its existence, has become very useful to the French watch trade. The site of the new building is in the Rue Manin. The buildings, which will cover a surface of 1,150 meters, will, it is anticipated, be finished in 1888, on the eve of the great exhibition.

THE SWISS WATCH INDUSTRY.—A fifteen-year old boy, Daniel Jean Richard, may justly be considered to be "the father" of the thriving watch industry in the Neuenburg Jura. A horse trader brought a watch from London, in 1679, and the ingenious boy, an apprentice to a blacksmith, although never having seen or heard of a watch, undertook to repair it, and imitated the mechanism so closely that in a short time he became a thriving watchmaker of the village of Neuenburg.

MEETING OF WATCHMAKERS.—The first General Watchmakers' Convention of Austria, to be at the same time an exposition of horology, will be held at Vienna, at some early day. The Exposition Committee has been appointed, and consists of Messrs. Löre, Chairman; Böck, Jecek, Linsbauer, Morawetz and Weybora. The project of meeting and discussing the affairs of the Austro-Hungarian watch trade interests finds great favor with the watchmakers, and the committee will meet at an early date, to devise rules and regulations, appoint the time and place of meeting, etc.

EXTRAORDINARY DIAMONDS AND PEARLS.—Messrs. Streeter & Co. lately received at their establishment in London a large number of visitors, who went there to inspect several objects of special interest. Among these is the largest rough diamond yet discovered. It was found at the Cape, weighs 406 karats, and is known as the "Victoria," the idea being entertained of presenting it to Her Majesty, at her jubilee, in June next year. Contiguous to this is an orange-colored cut diamond of wonderful brilliancy, weighing 115 karats, or 10 karats more than the Koh-i-noor. It has a border of large, round white diamonds, and, under lime light, it looks magnificent. Along with this is seen the largest black diamond in existence. There is also on view a perfectly unique formation of pearls, designated the "Southern Cross," found off the coast of Western Australia. This consists of nine pearls resembling in united shape that constellation, and it was discovered in 1884, in a pearl oyster, fished up on the North Australian coast. Beside these rare treasures there is a choice collection of rough diamonds and gold recently obtained from a river bed in Brazil, and close to them are eleven fine rubies in the rough, weighing together 190 karats, from the mines newly acquired by England in Burmah.

THE EVERLASTING ANTIQUE.—The taste for ancient furniture, which, abandoned by the upper ten, has now descended to the middle classes, has set a premium on those old cottage clocks of the type which was sung in a sentimental song, immensely popular a few years ago, about "My Grandfather's Clock that stood ticking in the hall," etc. The farm houses of Britany and Normandy have been ransacked by the dealers in antique furniture, and the market flooded with "Grandfather's Clocks" in more or less advanced stages of decay. Some of them are really fine works of art, both as regards the case and the works, and for them a very high price is asked. One, which the correspondent of *The Watchmaker, Jeweler and Silversmith* recently inspected in a shop in the Rue de Bellechasse, and which was cased in walnut wood and copper inlaid work, was priced at 1,000 francs, or £40. It was stated to be two hundred years old, and the works were said to be in excellent order. The commoner and less ancient qualities are proportionately as dear, 400 francs, or £16, being the general price for goods, which, with a little bargaining, one can pick up for from 25s. to 40s. in any Normandy or Britany farm house, for the French peasant looks on them as cumbersome and out of date, and is very happy to replace them with a mantel-piece *pendule*,

Workshop Notes.

TO CLEAN SILVER.—The simplest and quickest agent for cleaning silverware is hyposulphate of soda. It operates rapidly, is cheap, and has not been used yet for this purpose. A rag or brush, moistened with a saturated solution of this salt, quickly cleans heavily oxidized silver surfaces in a few minutes.

SOLDERING GERMAN SILVER.—Dissolve granulated zinc in hydrochloric acid in an earthen vessel. Cleanse the parts to be soldered, and apply the acid. Next put a piece of pewter solder on the joint, and apply the blowpipe to it. Melt German silver, one part; zinc, in thin sheets, four parts; then powder it ready for use.

TO PRESERVE THE LUSTER OF SILVER.—For preserving the luster of silver or plated ware, when not needed for actual use for considerable time, a coating of collodion may be applied to great advantage. The articles are heated, and the collodion is then carefully applied with a brush, so as to cover the surface thoroughly and uniformly. It is used most conveniently when diluted with alcohol, as for photographic purposes.

ORNAMENTAL DESIGNS ON SILVER.—Select a smooth part of the silver, and sketch on it a monogram or any other design you choose, with a sharp lead pencil, then place the article in a gold solution with the battery in working order, and in a short time all the parts not sketched with the lead pencil will be covered with a coat of gold. After cleaning the article, the black lead is easily removed with the fingers, and the silver ornament disclosed. A gold ornament may be produced by reversing the process.

PICKLE FOR FROSTING SILVER.—A good pickle for frosting silver is prepared of: Sulphuric acid, 1 drachm; water, 4 ounces; heat the pickle, and immerse the silver in it until frosted as desired, then wash off clean, and dry with a soft linen cloth, or in fine clean sawdust. Or, for frosting polished silver, use cyanide of potassium, 1 ounce, dissolved in one-half pint of water. Do not hold the silver in your hands, but use pliers made of lancewood or boxwood, and apply the mixture with a brush to the polished surface. Remember that cyanide is a deadly poison.

TO RENDER GYPSUM WATER PROOF.—The plaster of paris casts, which, when new and clean, are really an ornament on the mantel-piece, but they labor under the great objection that they become dusty and unsightly in a short time. They can be rendered impervious to water, however, which permits of their being washed; the process is as follows: Submerge the cast in a fairly concentrated solution of baryta for a space of time, of from 1 to 12 days, according to size and thickness; wipe with a cotton cloth, and dry in air. The gypsum has in this operation changed into sulphate of baryta, which is an insoluble substance. It is still porous, and to make it dust proof rub it with an alcoholic solution of soap; the soap substance, when the alcohol has evaporated, will fill the pores.

TO MAKE A SMALL, ROUND FILE.—Small round files, which the repairer constantly uses for enlarging the holes of dials, and other small jobs, belong to the tools that easily break. He can make these files himself, if no material store is close at hand, and thereby save himself vexation. The process is as follows: A piece of round steel of corresponding size, is filed tapering in the customary shape. Next place the steel upon a hard surface, take a larger shoulder file with medium cut, and press rather heavily upon the steel, and roll it to and fro. The steel will thereby receive a good cut, which is excellently well suited for working dials. The most difficult part next is the hardening, and this labor is greatly lessened if the file was not made too long. Hold it vertically in a large alcohol flame, until it has become darkened throughout, and dip it in water. If the job is performed with a little intelligence, you will have a nice file.

TO TRY PALLET SHAKES.—All pallets ought to have a trifle more shake outside than inside, because if the lever is moved around, say 1° too far, before the escape wheel moves on to impel, this 1° of the lever is an equal space on each side, but the two portions of circles which the outer and inner points of the pallets describe, are unequal spaces, the largest outside circle requiring a trifle more shake to keep the discharge point of the long pallet equally free of the back of the wheel teeth. The way to try pallet shakes is simple, but through the minuteness of the parts, and sight being either wholly or partially denied, it requires a practical hand to try an escapement nicely; bring round the roller pin into the lever notch sufficiently far to draw the locking out from under the wheel, until the wheel tooth stands at the extreme locking corner of the pallet, and holding the balance steady, move the wheel minutely to and fro if there is shake, and if there is no shake the pallets want a trifle off the discharge points. If the wheel tooth is only a trifle below the locking edges, there will apparently be shake, whereas there may not be any shake at all at the extreme locking corners.

TO OXIDIZE SILVER.—The favorite black tone, the so-called oxidizing on silver, is produced in different ways, either with chlorine or sulphur. The latter gives a bluish black, the former a brown tone. If a deeper black is desired upon the finished article, either of silver, bronze, brass or copper, and silver plated, I use sulphuret of potash, which I dissolve in distilled water, and warm a little; if the tone desired is to be more of a brown, I use sal ammoniac and sulphate of iron in equal quantities, dissolved in vinegar. But the easiest method, and sufficient for common demands, is to rub the article to be oxidized with sal ammoniac, and the black color is immediately produced. Should a larger surface become spotted or uneven in color, brush it with graphite. Mr. Kamarsch says, in order to coat silverware with a dark gray color, and to produce the so-called oxidized silver, immerse the manufactured and polished article in a very weak solution of sulphuret of potash and water, to which add a little sal ammoniac; when the desired color is produced, rinse in clean water, dry, and finish by polishing, which, with sufficient care, may be done. The gray color produced in this manner forms a very pleasing contrast for articles which are partly gold or gilt.

SIMPLE METHOD OF MOUNTING A CLICK SPRING.—The mounting of a new click spring is sometimes a vexatious job. I do it as follows, and always obtain a satisfactory result: When the old click spring has been taken down from the bridge, find a new one, which, in length from click to foot, into which the holes are drilled for fastening, is suited to the shape and length of the bridge. With three claws fasten this latter in an uprighting tool, placing the centering center into the screw hole of the bridge, which serves for screwing on the click spring. When the bridge has in this manner been mounted well upon the plate of the uprighting tool, raise up the centering center, and lay the new click spring, exactly as it is to be located in its place upon the bridge, carefully preventing the claws from covering that part of the bridge to which the spring is fastened. The upper face of the spring must, by so much as will be lost afterwards in grinding and polishing, protrude beyond the surface of the barrel bridge. Then retain the spring in its place by applying a finger, and lower the point of the uprighting tool upon the click spring, whereby a dot is made by a gentle pressure, exactly at the true spot. This dot is enlarged by punching, and a hole is then drilled exactly to suit the size of the screw. The burr is next removed, and the spring finished suitable to shape and length. If the bridge contains a foot pin hole, bush it by firmly driving into it a brass pin, file off its projecting part level with the bridge, and screw the spring in place. Then drill, as closely as possible to the extreme end of the spring, a small hole for the foot pin, clear through into the bridge. Harden the spring, anneal it, chamfer and polish the edges, grind and polish the surface, and fit in the foot pin. A clickspring mounted in this manner will, in appearance, be fully equal to the first, and besides this it requires very little time.

Trade Gossip.

Mr. Joseph Wolf informs us that he is not representing the firm of George Greenzweig & Co., San Francisco, Cal.

Mr. A. W. Bush, of Boulder, Colorado, died suddenly in that city, August 12, notice of which we have just received from his widow.

Wm. Seyfreidt has purchased the interest of Mr. Bettys in the firm of Bettys & Crosman, Auburn, N. Y. The firm will hereafter be Crosman & Co.

Cross & Beguelin have added to their stock an extensive line of mounted diamond work, and all the novelties for the holiday season can be found in their stock.

Louis Herzog & Co. call attention to their large and well selected stock of diamonds, watches and jewelry. Mr. Alfred Frank is the Eastern representative of this house.

Mr. Henry S. Oppenheimer, of the firm of Oppenheimer Bros. & Veith, sailed for Europe by the *Etruria*. His headquarters will be at Amsterdam, as buyer of diamonds for the firm.

The Hartford Silver Plate Co. have produced many new and rich designs in silver plated ware for the holiday season. Their goods are of the finest quality, each piece bearing their stamp.

Kirby, Mowry & Co. are manufacturing a fine line of solid gold white stone jewelry, consisting of lace pins, ear rings, scarf pins, rings, etc., also diamond and pearl jewelry in an endless variety.

Mr. John J. Connelly, assignee of Mr. B. O. Booth, who recently failed in this city, has filed the following schedule: Liabilities, \$41,581.31; nominal assets, \$31,761.44; actual assets, \$14,775.69.

Wm. H. Robinson & Co. are making a very large and assorted line of fine rolled plate and silver chains. They are constantly adding new and attractive styles which are desirable for all dealers to have.

The Providence office of E. E. & A. W. Kipling has been removed to 95 Pine street, in that city. The new quarters of the firm are very handsomely arranged and fitted up, giving them increased facilities for doing business.

Mr. N. Kauffman, of Veuve L. B. Citroen & Co., 21 John street, has imported a diamond of over 55 karats, which he claims is noteworthy by reason of the perfection of its cutting, which has developed its brilliancy to the highest degree.

S. F. Myers & Co. have secured a number of No. 97 Elgin key wind movements, which are very scarce, and now offer them to the trade. The new catalogue of this firm is meeting with much favor, and can be had by the trade on application.

Mr. Samuel Dodd, President of the Wilcox Silver Plate Company, was in attendance upon the banquet of the Jewelers' Association, this being the first he has been able to attend in several years. He received a most cordial greeting from a host of friends.

The report was current early last month that Mr. E. L. Fisher, a jeweler of Minneapolis, had left town, and that the place of his abode was unknown. It was also stated that previous to his departure he had pawned several hundred dollars worth of goods.

Mr. George H. Bryant, formerly of the firm of Bryant, Sproehle & Co., has associated with him Mr. Wm. A. Burrows, under the firm name of Bryant & Burrows, and will hereafter conduct a wholesale jewelry business at Nos. 63 and 65 Washington street, Chicago.

Ever since the Jewelers' Association was organized, Mr. D. F. Appleton has presided at one of the tables at every dinner given by that body until the last. His absence was generally commented upon by his old associates, who, appreciating the occasion of his absence, silently sympathized with him. The recent death of his wife was a severe blow to him, and the heartfelt condolences of the trade go out to him in his great affliction.

R. & L. Friedlander have prepared a new catalogue and price list of solid gold rings and lockets, containing numerous illustrations showing their latest designs in initial goods. The catalogue can be obtained by dealers on application, accompanied by their business cards.

The Wm. L. Gilbert Clock Company desires to call the attention of the trade to their large assortment of clocks, and to the new styles and designs introduced this season. Their factory is located at Winsted, Conn., but their principal salesrooms are in New York and Chicago.

Mr. F. Kroeber, of 14 Courtlandt street, has the reputation of devising the greatest number of novelties in clock casings that are offered to the trade. In addition to these many attractive styles he also carries full lines of French clocks in various elegant and attractive forms.

As circulars have been issued which tend to leave the impression that Joseph Fahys & Co. dispose of some of their products through other than the legitimate channels, they make an announcement of their only method of selling their goods, which is through the Jobbers' Association.

Sol Kaiser, of Chicago, representing Henle Brothers, of this city, while occupying a Pullman sleeper recently on the C. B. & Q. Railroad, was robbed of a wallet containing \$35. Fortunately the thief missed a much larger sum Mr. Kaiser had with him and also some valuable samples.

While Mr. J. G. Lumpus, of Seymour, Ind., was at supper, November 11, thieves broke into his store and secured about \$800 worth of watches and jewelry, with which they escaped. Suspicion attached to two book canvassers, one of whom escaped, the other being arrested and held for investigation.

A watchmaker named Louis F. Acker, employed by Sipe & Sigler, of Cleveland, was recently detected in robbing his employers. Goods, consisting of watches and diamonds, valued at \$500 were taken, about half of which were recovered. Acker was arrested and held to await the action of the Grand Jury.

B. Kahn & Son, 32 Maiden Lane, have issued a catalogue of optical goods which they will send to the trade on application. They have also many novelties for the holiday trade, among which is the "Parlor Kaleidoscope," an elegant parlor ornament as well as a never failing source of interest and amusement.

Mr. Thomas Allan, the oldest jeweler of Montreal, died in that city November 12, in the eighty-first year of his age. Mr. Allan was a native of Scotland, but located in Canada many years ago. He was the founder of the firm of Thomas Allan & Co., in which his sons are partners, and who will continue the business.

Ladies who are usually at a loss for a pocket in which to carry a watch will rejoice over the announcement of Payne, Steck & Co., in this issue of THE CIRCULAR. They have devised a pocket which may be fitted to any dress in any position at a moment's notice and at the same time afford adequate protection to the watch.

A. & J. Plaut, of Cincinnati, whose advertisement of a general line of watches, diamond goods, jewelry, etc., will be found in another part of THE CIRCULAR, announce a change in the prices of the automatic watches offered by them. The prices should be \$13, \$17 and \$19 instead of \$14, \$18, and \$20, as given in their last report.

The report so freely circulated in the trade last month, to the effect that the golden beryls recently discovered in the Berkshire hills were being taken out in such quantities as to impair their value as precious stones, was unfounded. So far from this being true, the gentlemen interested are feeling somewhat discouraged at the small numbers taken from the mines. They live in constant hope that they will be found more plentiful as the work goes on, but from present appearances there is no danger of the market being overstocked. They are a beautiful stone and the market would absorb a much larger quantity of them than are likely to be offered.

A young man named Ulric Bohl, employed by Delia Lazarus, of Montreal, for the past eighteen years, recently made off with a quantity of watches and diamond jewelry, escaping to this country. He was arrested in Troy and a large portion of the goods found in his possession. He was held with a view to securing his extradition.

Mr. William D. Carrow, sailed November 15, on Pacific Mail steamship for California, via Isthmus of Panama. He proposes to make a trip around the world and will be gone about two years. He will visit all of California, the Sandwich Islands, Japan, China, India and the Holy Land, returning through Italy, Germany, France and England.

The most complete and perfect inkstand in the market is the one invented by Mr. P. Hartmann, of this city. It keeps the pen entirely free from corrosive substances in the ink, and yields only so much as is required for writing purposes. The glass fountain is mounted on a silver plated stand, constituting a very handsome ornament for a library table.

The Waterbury Clock Company offers for the holidays, in addition to their regular lines of American clocks, a fine assortment of fancy clocks suitable for presents. The Waterbury Company's products are so well known that it is needless to attempt to enumerate the endless varieties, styles and designs in which they present time-keepers suitable for all requirements.

Schott, Cahoone & Co. have placed on the market a line of jewelry which has excited much attention. It is known as chestnut jewelry, made in watch charms, lace and scarf pins. They have succeeded in producing the exact color and shape of the chestnut. They make also a full line of sterling silver and polished Roman and rolled plate scarf pins. Their goods can be had from any jobber.

The Seth Thomas Clock Company, of Thomaston, Conn., have prepared drawings for the great clock which is to be placed in the tower of the new City Hall at Philadelphia, and which, if completed in accordance with their plans, will be the largest in the world. The bells upon which it will strike the hours and quarters will weigh 50,000 pounds, and the glass dials, as contemplated, measure twenty-five feet in diameter.

Smith & Knapp call the attention of the trade to their very full line of diamond ornamented gold cases, fourteen karats, ladies' and gentlemen's sizes. The ornamentation is very beautiful, consisting of the single star, trefoil, star and crescent, wreath, horseshoe and whip, and various designs. They are also importers of diamonds, and carry a full stock of precious stones in all forms. An examination of their holiday stock is invited.

Assistant Superintendent Heintzmann at Castle Garden, received Nov. 6 a letter from Mühlheim on the Ruhr, in which Carl Müller asks for information of his father, a goldsmith, Joseph Müller, who sailed from Hamburg, per ship *Oder*, April 1, 1863, since which time his family have heard nothing from him. Any parties able to give any tidings of his whereabouts, or life or death, are respectfully solicited to forward it to Mr. Heintzmann or Carl Müller.

The recent sale by Victor Bishop & Co., the well known importers of precious stones, of their immense stock of semi-precious and imitation stones to Albert Lorsch & Co., was one of the largest transfers of stock made in the jewelry trade in a number of years. The enumeration of items covered thirty-four closely written pages, and nearly a week was consumed in making the necessary examination of the goods and the transfer. Victor Bishop & Co. have determined to go out of this department of the business, and to devote their energies hereafter to handling precious stones only and to extending their business in this direction. They have a very large stock of these on hand for the holiday trade, and among the gems they offer are some of extreme rarity and great value. The addition thus made to the stock of Albert Lorsch & Co. enables this well known firm to offer the trade special inducements and many rare bargains.

The jewelers of Attleboro have shown much zeal lately in establishing a free public library. A lecture was given in aid of the fund on the evening of November 22, when Mr. J. M. Bates, of the firm of Bates & Bacon, placed the Opera House owned by him at the disposal of the committee free of charge. Watson & Newell have authorized the purchasing committee to purchase 100 volumes for the library and send them the bill. Other jewelers have contributed to the same object.

The latest novelty in the form of mechanism that requires a deposit of a five cent nickel to set it in motion, is to be seen in the store of J. J. Cohn, 41 Maiden Lane. It consists of a mechanical clock, having a picture of a man's face in the center of the dial. By dropping a nickel in a slit in the side of the case a procession is started which passes in view. It consists of bands, fancifully costumed groups, tumblers, etc., who go through various performances, all for five cents. It makes an attractive advertisement.

The Executive Committee of the Swiss Fair, held at Irving Hall, New York, report large and generous donations from the following Eastern manufacturers in answer to a request made by one of its number: Messrs. Rogers & Bro., Fred. I. Marcy & Co., Wm. H. Robinson & Co., W. E. White & Co., Howard & Son, The S. Albro Co., R. Blackington & Co., Cowell & Hall Manufg. Co., E. I. Franklin & Co., Foster & Bailey, Riley & French, Sturdy Bros., Waterbury Watch Co., Bates & Bacon, O. M. Draper & Co.

Mr. G. Scherzinger, of Fond du Lac, Wis., was robbed Oct. 26 by burglars who broke into his store, and carried off his most valuable stock in an old quilt. They were evidently frightened while making their escape and dropped the quilt, in consequence of which a great portion of the stolen goods was recovered. Mr. Scherzinger is a member of the Security Alliance and the first one who has been robbed. The case has been placed in the hands of Pinkerton's detectives, and the thieves will find little mercy at their hands.

The redoubtable Colonel "Pat" Donan, a Western politician who has attained some notoriety for extravagance in his statements, recently returned from Honduras, and claims to have secured an opal as big as a hen's egg. According to his statement there is but one larger in the world, and that is among the crown jewels of Russia. The Colonel is looking for a sweetheart on whom to bestow this treasure as an engagement ring. His enemies say that he will have to increase the reward materially before any respectable maiden will accept the bait.

On Saturday evening, November 13, a man entered the store of Charles H. Upmeyer, and asked to be shown some watches. They were exhibited to him, when he suddenly grabbed three of them at the same time throwing some red pepper in the face and eyes of Mr. Upmeyer. The thief darted out of the store, closely followed by Mr. Upmeyer, who, notwithstanding his sufferings, soon overtook the thief, who then drew a revolver, which caused his pursuer to come to a halt, whereupon the fellow made his escape. The watches he secured were valued at \$300.

The jewelry store of William H. Carroll, of Paterson, N. J., was robbed under peculiar circumstances early last month. Mr. Carroll was engaged in putting goods into his safe, preparatory to shutting up for the night, when a man whom he did not know entered the store. Mr. Carroll stooped to place some goods in the safe, when he received a severe blow on the head rendering him unconscious. When discovered he was lying at the rear of the store, some distance from the safe, and suffering from the blow he had received. The safe had been robbed of gold and silver watches valued at \$500, and a gold watch and chain and a considerable sum of money had been taken from the person of Mr. Carroll. Mr. Carroll's store is located in a very public part of the city, and it is believed that his habits must have been carefully studied for some time by the thieves to enable them to carry out the robbery in such a bold manner at a time when many persons were passing the store. No clue to the identity of the thieves has been found.

M. J. Paillard & Co. have just issued a new catalogue of musical boxes that is a gem in the way of illustrations and printing. The title page is artistically engraved, representing a little Cupid in a mass of flowers playing on a mouth organ. A view of the extensive works of the company at St. Croix, Switzerland, is given, followed by a brief description of musical boxes in general. The various styles of boxes are shown by engravings and their peculiarities described, with full instructions for ordering. These catalogues will be sent to the trade upon application.

The New York Standard Watch Company announce that they will in the course of a few weeks place on the market some of their movements, in which are embodied the new principle before alluded to in these columns, viz., an escapement operated by a grooved wheel or worm. It is claimed that, as the worm always turns in one direction, it produces an evenness of movement that is desirable and calculated to secure the best results. These watches will be made in all sizes and contain the latest improvements in design and finish. The factory of the company is located at Jersey City.

Recently a young man called at the store of Mr. J. T. Lynch on Broadway and purchased a watch, giving a check for \$71 and receiving \$8 in change. The check proved to be worthless. A few days later, while Mr. Lynch was riding down-town in a street car, he saw the young man who had swindled him. The thief recognized Mr. Lynch also and started to run, but was followed so closely that he finally surrendered and was turned over to a policeman. When arraigned in the police court he plead guilty to the charge preferred and was held for trial. He gave his name as Albert Simpson.

In the early part of last month, Mr. B. H. Merzybacher, a traveling jeweler, put up at the Fowler House at Port Jervis. When he left his room there was a case containing about \$8,000 worth of jewelry on the table, but carefully locked. When he returned the case was gone; so was a young man who had been acting as porter for the hotel. It was ascertained that he had taken a train for Turner's, on the Erie road, and the police of that place were notified. They soon located the young man at the hotel in that place, and proceeding to the room assigned him found him in the act of overhauling the jewelry, taking an account of stock, in fact. He was promptly taken into custody and held to answer.

A company has been recently organized in New York, under the name of the Geneva Non-magnetic Watch Co., Limited, with general offices in the Germania Building, 177 and 179 Broadway, N. Y., and factory in Geneva, Switzerland. This company claims to manufacture a watch wholly unaffected by magnetism. David Ward, the wealthy lumberman, of Detroit, Mich., is president, and his son, Chas. W. Ward, is general manager. These gentlemen, with W. S. Ward, H. W. Struss, L. Frank, D. E. Seybel, Jos. W. Fettecht and P. Busch, of New York, and C. A. Paillard and Louis Bornand of Geneva, Switzerland, constitute the board of directors. It is understood that this company will be ready to place its goods on the market for the spring trade of 1887.

Ernest Keyes, a workman employed by Howard & Son, of Providence, was detected recently in stealing clippings in the factory. It has been the custom to gather up all the clippings every night in the engraving room, and put them aside until a sufficient quantity has been secured for melting over. There is about an average of \$400 to \$500 a month, but a few weeks ago it was noticed that the amount fell short about \$100. Suspicion fell upon Keyes, and at the next cleaning up he was watched by a detective. He was seen to leave the factory when the clippings were gathered and go to the express office. There it was found that he had left a package addressed to himself at North Attleboro. He was arrested and then confessed the previous theft. He was held to answer.

Mention has heretofore been made of a self-winding clock invented by Mr. Chester H. Pond. Mr. Pond is an expert electrician and an inventor of many valuable electrical appliances. He has applied electricity to the construction of clocks, and by its use perfected a self-winder. A small battery is placed in the top of the case, and, as so little power is expended in the winding, a very small battery will do the work for a year. A company has been formed for the manufacture of these clocks called the Self Winding Clock Company, their office being at 17 Murray street in this city. A branch office, to be in charge of Mr. J. Quincy Walker, a gentleman of experience in the clock business, will be opened in Chicago December 1. These clocks are especially intended for offices and public buildings, and several dials may, if desired, be connected electrically and operated from a single movement.

Mr. A. C. Smith, formerly with the American Watch Company, has been chosen president and general manager of the Vesta Mineral Spring Company. This spring is located at Waukesha, Wisconsin, and is identified with the jewelry trade, inasmuch as the stock of the company is owned largely by jewelers, a number of whom are in the habit of spending a part of each season enjoying the beautiful scenery surrounding it. The water from this spring makes a delightful and healthful table beverage. Mr. Smith has an extensive acquaintance in the trade, having been a traveler for the American Watch Company, after which he was manager for two years of the Boston house of Robbins & Appleton, and later their New York manager. He then became general superintendent of their gold case factory in Bond street, from which he recently retired. Mr. Smith is well calculated to make a successful enterprise of the Vesta Spring Company.

The disgraceful failure of Rothschild & Co., of Toronto, recently, has caused some comment in the trade. The firm consisted of Max Hurrich and Louis Bush, both of whom formerly resided at Elmira in this State. They had bought goods largely abroad and in New York, and had subsequently disposed of them to brokers and others at a great sacrifice. Suspicion being aroused, they hurriedly made an assignment to the sheriff and hastily decamped, coming, as is supposed, to the United States, where they are safe from pursuit. Their liabilities are believed to exceed \$100,000, and the estate to be so hopelessly involved that the creditors will realize little, if anything. The firm has been in business for about twelve years and had enjoyed a good reputation, except that Hurrich had been in difficulty in this country, but it was understood that he had settled satisfactorily with his creditors. Both men were sporting characters and fast livers. Some Canadian jewelers are among the losers by their failure.

A bold burglar, who attempted to rob the store of Mr. J. B. Dodge, at Millbury, Mass., recently, met with a rather warm reception. Mr. Dodge and his wife sleep in the rear of the store, and on the night in question, heard some one trying to break into the store. Mr. Dodge rushed to the front with his revolver in hand, and arrived just in time to hear a crash of glass, and to see the arm of a man pushed through the window he had broken. Mr. Dodge at once fired at him, when the man disappeared. Two more shots were fired at him but he escaped. Several neighbors who had been aroused by the firing, assembled in the store of Mr. Dodge, and while talking over the matter, a stranger came in and asked to be directed to a drug store, saying he had been shot in the arm. On being asked who shot him, he said it was done at a jewelry store near by, whereupon he was taken into custody. He appeared to be an old offender, subsequently boasting that he had stolen a horse from a priest, and that he had served two years in state prison. He was held to answer.

A young man named Charles Shaw, employed in the Aurora Watch Factory, has been detected in stealing movements from the company. He is believed to have taken about one hundred in all, which he disposed of by the assistance of an elder brother and a tramp tinker, who sold them around in saloons. All three were arrested and held to await the action of the Grand Jury. The goods stolen are valued at from \$1,500 to \$2,000. It was found that the method adopted by the thieves was to take the parts of different movements and put them together, thus making a movement not liable to detection. As many as six different movements were despoiled to make one. From this fact it is believed that some of the most skillful workmen must have been in collusion with the thieves and interesting developments are expected.

A single time standard for the world is the next change proposed. That will be the Greenwich civil day, commencing 12 hours earlier than the astronomical day, whose beginning is at the Greenwich noon, and the hours will be numbered up to 24 instead of in 2 series of 12 each. Midnight and noon will then cease to be inseparably associated with 12 o'clock, and will occur at hours varying with the distance in longitude from the Greenwich meridian. The advantage urged for making the universal day coincide with the Greenwich civil day is that the change of date at the commencement of a new day falls in the hours of the night throughout Europe, Africa and Asia, and that it does not occur in the ordinary office hours (10 A. M. to 4 P. M.), in any important country except New Zealand. In the United States and Canada the change of date would occur after 4 in the evening, and in Australia before 10 in the morning. Only in the parts of the world that are almost entirely water would it occur about the middle of the day, and this arrangement would thus reduce the inconvenience to a minimum.

Greenville, S. C., is a thriving city, but like most cities in the South, has been woefully deficient in hotel accommodations. Recently Mr. T. M. Avery, president of the Elgin Watch company, was on a visit through the South for his health, and made a stop at Greenville, where his daughter-in-law, Mrs. Avery, owns the Mansion House, a venerable establishment that had been conducted after the plan of ordinary country hotels. Mr. Avery saw that the city needed first-class hotel accommodations and so determined to rehabilitate the old Mansion House. Under the direction of himself and his daughter-in-law additions and alterations were made in the old building, modern improvements introduced and the entire house refurnished in the most improved style. Then a revolution was made in the cooking department, and now the old Mansion House, in its rejuvenated form, is one of the best hotels in every respect to be found between New York and New Orleans. An experienced hotel manager has been placed in charge and tourists in the South can now be sure of first-class hotel accommodations at Greenville.

The difficulty between "Sam" Small, the alleged revivalist, and Mr. Steinau, of Cincinnati, has been satisfactorily arranged. "Sam," after preaching against the use of jewelry and condemning it as a snare of the devil, bought a lot of goods on credit from Mr. Steinau and left the city without paying the bill, amounting to \$330. Mr. Steinau mentioned the matter to a clergyman, who indignantly denied that "Sam" owed anything. The newspapers having got hold of the story, and the representation having been made that Mr. Steinau was persecuting the alleged evangelist, he determined to vindicate himself, and so brought suit to recover the amount of his bill. "Sam," hearing of the scandal, wrote a letter to the papers abusing Mr. Steinau, but the suit brought the reverend debtor to his senses and he paid his bill like a little man, and wrote a letter to Mr. Steinau withdrawing all the unpleasant things he had said, and virtually admitting that he had not told the truth in the matter. The ungodly were greatly rejoiced when they learned of the "depravity" of the evangelist, who, while preaching against jewelry, was running up a bill for precisely this kind of "abomination" that he could not pay.

Charles Lyell, the eminent geologist, says that the interior of Mexico is the richest known argentiferous section in the whole world. The fact was long ago established that a metaliferous vein runs without interruption through the entire length of the cordillera of Anahuac, extending from the Sierra Madre in Sonora, near the northern border to the gold deposits of Oaxacar, in the extreme south of Mexico. This exhaustless vein traverses no less than seventeen States, and since the day of its discovery its mineral yield has been more than \$4,000,000,000 worth. And yet these valuable sources of wealth are estimated to be not more than one per cent. of the undeveloped and undiscovered whole.

Some of the largest dry goods houses in Chicago make a business of carrying lines of jewelry, watch movements, cases, etc. Recently W. A. Moore, manager of the Dueber Watch Case Co., purchased cases at one of these houses which were sold him at trade prices without any question being asked as to whether he was in the trade or not. The Dueber Co. thereupon issued a circular announcing that it had always been the policy of that company to protect the trade, and to confine the handling of their goods exclusively to persons engaged in the trade. The purport of the circular was to show that certain makers of movements and cases were selling their goods to outsiders in spite of the rules, regulations, pledges, etc., of the National Association of Manufacturers and Jobbers in Movements and Cases. This called forth a circular from the Association, denying that the Dueber cases are sold under any restrictions that are not common to all the case makers in the Association. Which also says that an investigation had been made to ascertain where the dry goods house referred to obtained the goods specified, and it was found that they had been regularly sold by a jobber to an exporter who, in violation of good faith, instead of sending them out of the country, had disposed of them to the dry goods house in Chicago. No one engaged in the transaction was found to have violated any rule of the Association, but to prevent anything of the kind being done again, the Association will impose such restrictions upon sales to exporters as will prevent the goods from falling into the hands of outsiders in future.

The tenth semi-annual meeting of the Ohio State Association of Retail Dealers was held at Columbus, November 10 and 11. Samples of the goods bearing the Guild stamp were exhibited and commented on by J. H. Purdy, of Chicago. Mr. John C. Dueber also addressed the assemblage on the importance of associated effort to secure reforms in the methods of conducting business. The members, by invitation, visited the factory of the Columbus Watch Company, and expressed themselves as much pleased with what they saw and at the attention shown them. Attention was called to the fact that the two principal dry goods houses in Chicago were now making a specialty of jewelry, and carrying full lines, offering the goods at prices lower than the legitimate retail dealers could afford. A committee of three was appointed to inquire into the matter, and after a few minutes consultation the committee reported that it could not ascertain that any jobber had sold the goods to the houses named, and requested the secretary to ascertain and report all the facts. The committee recommended that if a satisfactory explanation was not made by the manufacturers of the goods in the hands of these outsiders, the members of the association would cease to patronize them. The report was adopted. The following named gentlemen were elected officers for the ensuing year, after which the association adjourned to meet in the same city during the fourth week in April: President, D. Furtwangler, of Washington Court House; Vice-Presidents, LeRoy Decker, of Marysville, and S. W. Brock, of Hamilton; Secretary, C. T. Olin, of Piqua; Treasurer, John Worrell, of Washington Court House; Executive Committee, M. Hammelrath, of Cincinnati, G. Ryder, of Delaware, C McLean, of Athens, S. C. Sisson, of Covington, and C. F. Gray, of Jamestown.

Bowman & Musser, of Lancaster, Pa., issue a neat little holiday greeting to their friends in the shape of a circular, discussing "the outlook," and showing, from the present condition of the country, that an excellent holiday trade is to be anticipated. A feature of this circular is that nowhere does it indicate that it is an advertisement for an enterprising jewelry house. The gentlemen evidently believe, with truth, that it is a good thing to keep their names before the public, and that in doing that they accomplish their object, exciting curiosity, even better than they could with a long enumeration of the varieties of goods they carry.

The annual meeting of the Jewelers' League will be held next month, and it is anticipated that there will be several important matters brought up for consideration. It is desirable that as many members as can do so will be present to take part in the proceedings. Among other propositions that will be submitted is one looking to the establishment of a half-rate class, the members of which will be required to pay half rates and only to receive half benefits. It has been found that there are many young men in the trade who ought to be members, but who feel that they cannot afford to pay sufficient to secure the full benefits. Some of these have requested to be allowed to pay one-half rates and receive but \$2,500 instead of the full benefit of \$5,000 in case of death. The proposition will be submitted to the membership for consideration at the January meeting. Many of the assessment companies that are now so popular have several classes, each paying a specified benefit of from one to ten thousand dollars, according to what the member can afford, and there are many who feel that this feature might be safely adopted by the League, thus increasing its membership and enlarging its field of usefulness correspondingly. Other matters of interest will come up for discussion, and all members who have the interests of the League at heart should strain a point, if necessary, to enable them to attend.

It is fitting that makers and dealers in works of art should bring their products to the attention of purchasers in an artistic manner. The *édition de luxe* catalogue of the Morgan collection, as well as those of the Academy exhibits, are notable examples of this appropriateness. Now comes the well-known manufacturers of silver plated ware, the Meriden Britannia Company, with a catalogue of their wares far exceeding any of their previous publications, and rich with clean, tasteful illustrations. Among over three thousand objects here represented, some in their natural colors of gold, silver or niello work, one is amazed no less at the multiplicity of designs than at the careful and exact delineation of every pure outline and every delicate touch of decoration which characterize the designs themselves. Opening the huge folio exceeding 450 pages, the eye meets first a full page steel engraving of the works of this company in Meriden, Conn., which are among the most extensive in the world devoted to the production of these articles. Following this, the illustrations, drawn to a scale and arranged alphabetically, cover every page. Below each are the numbers, a brief description of the different styles of ornamentation which decorates them, the prices, and, in parenthesis, a code-word for use in telegraphing. The book has a thumb or marginal index at the beginning of each letter. Indices also begin and end the volume. The covers bear a symbolic fancy, in gold and silver, representing a crucible from which the parting fumes rise circularly to unite above in a finished article of plate. Naturally a book of this size and general character entails an enormous expense, over fifty tons of paper, in addition to the engraving, electrotyping, binding, etc., being used in this edition. Therefore, while they are distributed gratuitously, only those will receive one whose purchases warrant the extension of so expensive a compliment. Meanwhile the beautiful objects themselves may be examined at the several salesrooms of the company, in Union Square, New York; State street, Chicago; San Francisco, Canada, and London, England, as well as in all the leading jewelry stores of the country,

Mr. William C. Arthur, one of the oldest jewelers in this city, died early in November at the advanced age of eighty years. Mr. Arthur learned his trade in this city when a boy of a Swiss named Daguerre, who was noted as a manufacturer of filigree and Etruscan jewelry. Daguerre tired of this country, and finally returned home, leaving his business to Mr. Arthur and Mr. Peckham, who was also an apprentice with him. The young men continued the business, making and selling what they made themselves. Later they took into partnership Mr. J. B. Rumrill, and the business, then highly successful, was conducted under the firm name of Arthur, Peckham & Rumrill. About 1845 Mr. Arthur retired with a competence, and was followed soon after by Mr. Rumrill. Mr. Arthur, however, soon discovered that he had given up business before his activity was exhausted, so he resumed, and after one or two experiments he joined forces with Mr. Rumrill, his old partner, who had also grown tired of a life of inactivity, and established the firm of Arthur, Rumrill & Co. They were prospered in business, and in 1872 Mr. Arthur again retired, taking up his residence in the Grand Hotel, where he continued to live up to the time of his death. Throughout his long business career, Mr. Arthur enjoyed the respect and confidence of the trade in the highest degree, and was quoted as a man of sterling integrity, high-minded in all his dealings, and a public-spirited citizen. John R. Greason & Co. are now the successors to the firm of Arthur, Rumrill & Co.

The following members of the trade were in the city during the past month: Wm. Tallmadge, Viroqua, Wis.; H. M. Doughead, Marinette, Wis.; J. V. Akey, Colon, Mich.; W. N. Boynton, Manchester, Iowa; C. S. Taylor, Clinton, Iowa; A. H. Wagner, Prairie City, Ills.; F. E. Dawson, Milwaukee, Wis.; J. W. Spence, Racine, Wis.; F. A. David, Muscodó, Wis.; A. Gill, La Harpe, Ills.; R. A. Davison, Rock Falls, Ills.; W. H. Mathews, Genoa, Ills.; A. Stern, Cedar Rapids, Iowa; C. A. Cole, Winterset, Iowa; G. D. Ellwood, Ovid, Mich.; V. S. Cooper, Princeton, Ills.; J. S. Royer, Rossville, Ills.; A. Koenig, Huntington, Ind.; G. Lyon, Hammondspport, N. Y.; S. Swope, Terre Haute, Ind.; M. Beebe, Watertown, N. Y.; J. C. Hanna, New Castle, Pa.; J. W. Grubb, Wheeling, W. Va.; J. A. Meyer, Canton, O.; W. Chance, Canton, O.; J. F. Leighton, St. Louis, Mo.; A. Moses, Richmond, Va.; C. K. Collins, Athens, Ga.; C. B. Jacquemins, Helena, Mont.; R. F. Pollack, York, Pa.; J. E. Bixler, Easton, Pa.; J. W. Mussina, Williamsport, Pa.; C. P. Eldred, Honesdale, Pa.; A. Boutin, Buffalo, N. Y.; C. K. Giles, Chicago, Ills.; J. R. Reed, Pittsburgh, Pa.; W. C. Kendrick, Louisville, Ky.; J. Browne, Manchester, N. H.; E. E. Isbell, Cincinnati, O.; G. G. Goodrich, Chicago, Ills.; T. E. Doughty, East Saginaw, Mich.; A. Gunther, Toronto; S. Thomas, Jr., Charleston, S. C.; T. B. Merrill, Portland, Me.; J. H. Grant, Troy, Pa.; C. Jenness, Mauch Chunk, Pa.; D. Kline, Denver, Col.; E. H. Carpenter, Burlington, Ia.; W. G. Bailey, Helena, Mont.; A. C. Wortley, Kalamazoo, Mich.; F. T. Jeannot, Youngstown, O.; H. Joseph, Montreal; C. L. Erickson, Omaha, Neb.; J. L. Norton, Chicago, Ills.; James Allan, Charleston, S. C.; G. T. Tress, Columbus, O.; P. Whitman, Beaufort, S. C.; A. Lathrop, Syracuse, N. Y.; C. S. Ball, Syracuse, N. Y.; J. Gumbinger, Jacksonville, Fla.; G. W. Biggs, Pittsburgh, Pa.; Steele Roberts, Pittsburgh, Pa.; W. H. Hennegen, Baltimore, Md.; R. Leding, Washington, D. C.; L. L. La France, Elmira, N. Y.; C. W. Freeman, Scranton, Pa.; W. H. Chapman, Schenectady, N. Y.; W. Nordhoff, Washington, D. C.; J. A. Worrall, Washington C. H., O.; S. T. Little, Cumberland, Md.; M. B. Finch, St. Paul, Minn.; Chas. Eustis, Minneapolis, Minn.; J. R. Elliott, Minneapolis, Minn.; W. B. Boyd, Bloomington, Ills.; E. McGannon, Columbus, O.; A. W. Morck, Warren, Pa.; A. Drolet, Quebec; Geo. H. England, Holyoke, Mass.; Gen'l Geo. H. Ford, New Haven; H. Semken, Washington, D. C.; E. Harris, Washington, D. C.; Geo. W. Banks, C. Weaver, W. L. Cook, Phila., Pa.; J. G. Grogan, W. W. Wattles, Pittsburgh, Pa.; H. Tilden, W. H. Thurber, Providence; A. T. Hubbard, Cleveland; B. Park, Salt Lake City; W. H. Bigelow, Boston; Geo. H. Richards, Jr., Boston; C. H. Solomon, Macon, Ga.; D. H. Buell, Hartford, Conn.



VOLUME XVII.

NEW YORK, JANUARY, 1887.

No. 12.

THE JEWELERS' CIRCULAR AND HOROLOGICAL REVIEW

Official representative of THE JEWELERS' LEAGUE and of THE NEW YORK JEWELERS' BOARD OF TRADE, and the recognized exponent of Trade Interests.

A Monthly Journal devoted to the interests of Watchmakers, Jewelers, Silver-smiths, Electro-plate Manufacturers, and those engaged in the kindred branches of art industry.

SUBSCRIPTION :

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“Speed the Departing; Hail the Coming” Year.

IT IS WITH considerable reluctance that we bid good bye to 1886, for it has dealt kindly with the general business of the country, and most persons engaged in manufacturing and commercial enterprises have cause to be thankful for the success that attended them through the year just past. As they greet the new year they fondly hope it will deal with them with equal kindness, and at its close leave them with as abundant cause for rejoicing. Following upon the heels of a period of business depression, 1886 opened full of promise, and the prediction was general that a season of prosperity was at hand. This prediction was fulfilled only in part, because of the excesses indulged in by the laboring classes in the early spring. Evidently anticipating a good season for all kinds of business, the workmen struck for higher wages in many lines of industry, and in some cases for eight hours' work. The Knights of Labor came to the front and took direction of these strikes in all lines, but, after keeping several thousands of workmen out of employment for many weeks, the workmen were obliged to succumb and return to work, as a rule, at the old terms. But the extent of this dissatisfaction among workingmen, and the uncertainty of engaging labor for any length of time at stipulated wages, tended to unsettle all kinds of business, to make capitalists afraid to invest in new enterprises, and manufacturers and dealers conservative. The war between capital and labor, as it was termed, lasted many weeks, during which time various lines of business were almost paralyzed, and all others suffered from sympathy. But eventually the strikes ended with the workmen returning to their places without having improved their condition, but

having sacrificed millions of dollars that would have been paid to them in wages but for their own foolishness, and lost the confidence of their employers in a great degree. It took the country several months to recover from the shock of this labor struggle, and, indeed, there are many employers who have not yet recovered their confidence in their workmen. But American enterprise is quick to recover from reverses, and when the first symptoms of the fall trade began to be felt everybody was encouraged to make the most of it, and consequently the volume of business transacted during the last months of 1886 was fully equal to the promise of the early spring. Had it not been for the disorders consequent upon the strikes, the season would unquestionably have been one of almost unequalled activity from first to last.

The activity of the fall trade, however, was sufficient to encourage everybody, and to induce them to believe that 1887 is to be a year of more than ordinary prosperity. All indications point in this direction. Take the dry goods trade, for instance; there has not been a time for many years when stocks in the hands of the great wholesale dealers and importers were so completely reduced as they now are; warehouse after warehouse that is ordinarily filled with goods that have to be carried over is now empty, the insurance thereon cancelled, and the proprietors waiting patiently for the mills to produce the goods with which to restock. Heavy orders have gone forward for the spring goods, and the dry goods trade, like all others, is expecting great activity in the spring. All reports indicate that the retail dealers are selling goods readily, that they are carrying comparatively light stocks and will require stocking up in the spring. What is true in other lines of trade is equally true in the jewelry trade, and the present outlook for the business of next year is flattering. Manufacturers are busy preparing for the coming season, and the factories have employed more men during the past few months than for many a long year before. There is just enough of a feeling of distrust, however, prevailing to prevent running to excess in the matter of production, and to infuse a conservative spirit that will be effectual in preventing overproduction to any serious extent. The feeling is that one should be prepared for a large and active demand, but wait till the demand makes itself felt before committing himself to an extent that may possibly prove disastrous. Thus, while 1886 retires in good order, calling up little besides pleasant remembrances, it also ushers in the new year under bright auspices that give promise of a prosperous season for all kinds of business.

Close of Volume XVII.



THIS ISSUE of THE CIRCULAR brings to a close its seventeenth volume. For seventeen years this paper has been published in the best interests of the jewelry trade, and it can be justly said of it that on no occasion has it proved false or recreant to its duty. At all times it has been an earnest and zealous advocate for the main-

tenance of those principles and ideas that were best calculated to advance the reputation of the trade for integrity, for progress and the development of the highest degree of skill and art in its products. The temptation to uphold sham and fraud has not been wanting, but never has it been yielded to, and the best evidence that it has been true to the principles first announced by its founder is found in the continued confidence extended to it as indicated by the patronage it enjoys, never greater than during the past year. THE CIRCULAR has always been conservative in its tendencies, never resorting to clap-trap of any kind to extort a few dollars more from its patrons, but has persistently gone forward in the even tenor of its way, steadfastly exerting its influence in behalf of legitimate trade and manufactures, and opposing shams and frauds that have sought shelter under the wings of the trade. It has been the ambition of the proprietors of THE CIRCULAR to give to the public in the interests of the jewelry trade the handsomest and most artistic trade journal published in the world, and this high honor has long been conceded to it by the publishing fraternity.

It has also been the aim of the proprietors of THE CIRCULAR to present in each issue a variety of technical articles relating to the various branches of the jewelry trade that should prove entertaining and instructive. This purpose has been faithfully carried out, and the back numbers of THE CIRCULAR contain enough solid, substantial technical articles, written by experts in various lines, to make several text books for the instruction of beginners in business and to serve as aids to more advanced workmen. The value of these articles is testified to by all classes of workmen in the various branches of the trade, who are continually asking us to put these treatises in book form so that they can preserve them. Many of these valuable articles are translated into other languages and reprinted in the technical papers of Europe, which is usually regarded as a high compliment to authors. In the future, as in the past, we shall spare no expense in our effort to secure the best writers on trade matters for THE CIRCULAR.

Few persons, not engaged in the publishing business, have an adequate idea of the cost of producing each month a magazine like THE CIRCULAR. In the first place, the special type, material, presses, etc., make up a plant that ties up a large amount of capital as a permanent investment; it is notorious that no mechanical plant deteriorates so rapidly as that of a printing office, and, as a consequence, the monthly expenditure for new type and other material is an important item. The quality of paper used on THE CIRCULAR makes it very costly, while the quantity used is something marvelous; to print a thirty or forty page paper is usually considered a commendable work, but THE CIRCULAR prints from eighty to one hundred and twenty, and thus consumes as much paper in one number as others do in half a dozen issues. Then comes the cost of composition, type setting, which is paid for by the thousand ems, and, of course, the more pages the greater the number of thousands required to fill them. Presswork is multiplied by the number of pages printed, so that this item is also a large one. Binding and mailing cost also, in proportion to the size of the paper, while the postage is figured by weight. In short, every item going to make up the cost of publishing a journal is multiplied by its size, and one issue of THE CIRCULAR, with its mammoth size, costs more to produce than does the production of any other trade journal in this country. This refers exclusively to the mechanical work; in addition, the editorial expenses are large, while payments to special contributors constitute a large sum in the yearly aggregate.

While, therefore, THE CIRCULAR has always enjoyed a liberal patronage at the hands of the trade, it has been the policy of its proprietors to give a liberal return therefor, and we allude to the matter of cost for the purpose of showing that it requires the expenditure of a large sum to produce this journal, and to maintain its standard so that it shall be a credit to the interests it represents. Those in the trade who have had experience in publishing catalogues, especially large and elegant ones, will appreciate the work and

expense involved in getting out a monthly journal of the size, style and character of THE CIRCULAR.

As to the future, we have no promises to make; it has been our policy to improve the character of our work with each year, and at the close of each volume to say to ourselves, in all sincerity, "This is better than any of its predecessors." We feel that we can honestly say this as we close volume seventeen, and we shall earnestly strive to make the same remark true of volume eighteen. All of our well known corps of writers will continue to contribute to our columns during the coming year, and we are negotiating with others to supply still additional attractive features, which will be announced in due time. We shall aim to improve THE CIRCULAR in every possible way, and by so doing justify the trade in reposing confidence in us as it has done for the seventeen years last passed.

Wishing all our friends a happy and prosperous year we commend to them THE CIRCULAR for 1887, with the assurance that we shall seek to make it a strong ally in their behalf.

Congress Again at Work.



CONGRESS assembled December 7th for the short session. The election of last fall brought but little change to the political complexion of that body, but it is greatly to be hoped that its working capacity has been largely augmented. At least it is to be hoped that the body about to assemble will give more attention to the requirements of the business portion of the community than the last Congress did, and that such legislation as the commercial and manufacturing interests of the country demand will receive respectful consideration. There are no political issues of importance crowding upon the attention of our statesmen, and beyond the usual discussion of the tariff question that seems inevitable, there is no question of practical or theoretical politics now visible to distract them from those matters of vital interest to the well being of the business interests of the country. Tariff tinkering will, of course, occupy considerable time, but the country has become so used to yearly spurts of congressional eloquence on this topic, intended solely for political effect, that it has become to be regarded as a sort of escape valve for congressmen to blow off their excessive patriotism for home consumption. Still, if the country could be assured that Congress would not disturb the tariff for the next five years, it would be worth several millions of dollars to the business community, simply by reason of the increased confidence it would give to all classes of enterprise.

The most important measure for the relief of business men that is likely to come before Congress this winter is the national bankruptcy bill. This should be brought forward at the first opportunity, and persistently agitated until it becomes a law. This bill has been before Congress three or four years; it is thoroughly understood by all classes, and there should be no further delay in enacting it into a law. The diverse and contradictory laws relative to insolvency prevailing in the various States, virtually offer premiums for rascality, and constitute the most serious embarrassments business men have to encounter in doing business on credit. The creditor class never knows on what ground it stands as regards the law of insolvency to which individual debtors are amenable, for the reason that what is law in one State is not the law in another. It seems to have been the purpose of the legislatures of some of the States to so hedge around their own citizens as to give them immunity from prosecution by non-resident creditors, so that it is often regarded by the latter as a waste of time and money to attempt to collect from an insolvent's estate in the State where it is located. The obstacles imposed by

State laws to the collection of honest debts from insolvents has done more than any one thing to foster the pernicious practice of compromising with bankrupts on a basis that encourages rascality, and enables the bankrupt to continue business on better terms than his competitors, who pay dollar for dollar, enjoy. A national bankruptcy law, making all proceedings in insolvency cases uniform in all the States, would tend to lessen the number of fraudulent bankruptcy cases, and to put the credit system of the country upon a much more substantial and satisfactory basis. The bill before Congress, generally known as the Lowell bill, has been approved by the more prominent Boards of Trade of the country, and the arguments for and against it have been fully discussed. While some valid objections have been raised to some minor points of the bill, it is on the whole so much better than nothing that the business men would be glad to see it passed as it stands, trusting to time to discover and remedy its defects. The old national bankruptcy law, with all its conceded defects, was far preferable to the present system of trusting to the laws of the different States, and the Lowell bill is a decided improvement over the old law. It is to be hoped that the various trade interests of the country will unite in urging Congress to give early attention to the national bankruptcy bill.

Another measure that should have early consideration is the proposition to repeal the silver law as it now stands, which compels the treasury department to purchase two millions of dollars worth of silver a month and coin it into debased silver dollars, worth only about seventy cents on the dollar. This debased currency is not wanted, the commerce of the country refuses to absorb it, or even a small proportion of it, but as fast as it is coined it is stored up in the treasury vaults, that are now filled to overflowing. The substitution of silver notes of small denominations by the act of last winter, which are redeemable in silver, is something of a relief from the cumbersome silver dollars that were attempted to be forced upon the public, but the only advantage the notes have is that they are a little more convenient to handle. While, however, they are called dollars, and are circulated as such, they have no greater actual value, of course, than the silver dollars held by the government for their redemption, and that value at present is about seventy per cent. of the face value. What the business of the country requires and will demand until it secures it, is a circulating medium that is intrinsically worth what its face calls for; it does not matter so much what metal such a currency is to be redeemed with, provided it is redeemed at one hundred cents, intrinsic value, on the dollar. If the silver notes are to be continued as currency, then Congress should provide for the recoinage of the existing debased silver dollars into actual silver dollars with which to redeem the notes. Upon this basis, the notes would at once attain a value and importance as a circulating medium that they are not otherwise likely to reach. The notes, such as have been issued, are handsome and convenient, and all that is lacking to make them desirable and popular is to make them redeemable in honest silver currency instead of in silver dollars that are only worth seventy cents each. Unless Congress does this, the new silver notes will be spued out by the business community as absolutely as the debased silver dollars have been. The new notes have been accepted thus far as a curiosity, but comparatively few have been issued; when the attempt is made to force them out in large quantities the public is likely to rebel against them, as it has against the alleged coin set aside for their redemption.

Congress has paid but little attention for several years to the demand made by the business community for legislation in its interests, and efforts should be made to bring to bear upon that body such a weight of influence that it will not dare to disregard it. If it can be induced to act this winter on the two questions we have alluded to, a good work will have been done, and indication given that our so-called statesmen are not entirely oblivious to everything that has not some political signification attached to it by which they may advance their own personal interests.

The Art Development of Many Centuries.



IT IS THE habit of every age to claim for itself the highest civilization and the most advanced art development of the centuries, and to fail almost entirely to give credit for that which is due to the past. Among the best teachers of the erroneousness of such assumptions, and the most effectual cold baths to our self-conceit in these respects are the various museums of antiquities to be found in different countries. From these we learn the somewhat disagreeable but pertinent fact that we are filling but a small page in the history of the ages, and that our possessions, whether of literature, science, art or general knowledge, are largely the gift of previous centuries, to be used and improved by us and then transmitted to future generations, to be increased by them to an extent we little dream of, as we have improved upon the foundation principles handed down to us. Every preceding age has, no doubt, been quite as egotistical as we are, each one having looked with contempt upon the achievements of its predecessors, and devoting itself to the building of monuments whereby future ages should be taught to admire the glories and powers of the present. An entertaining writer in the *Journal of Commerce*, who recently wrote regarding a visit he paid to the Metropolitan Museum of Art in this city, says: "If men knew what former generations have done, if each age were brought into close acquaintance with the human intellect and its products in preceding ages, it would hardly be possible for the men of any one period to fail to recognize their obligations to the long line of civilization in which they stand at only a temporary end, and to render profound respect to the power of that intellect in age after age." It is the popular mind, not the scholars of the age, that needs this education. It should be a fundamental principle of education to impress on the young mind that we are not the discoverers of all that is known in the world; that we have received from the dead generations most of what we know and deliver it to the young for their use and improvement, to be again handed along by them with what additions we and they may make to the sum total. Whatever employment in life a young man is destined for, he should not only know what other ages knew, but he should have that personal conviction which can only come from personal relations with those ages. Next best to the knowledge of the languages in which previous generations have recorded their ideas and experiences, is the opportunity to see with their youthful eyes the products of men's thought and work in the by-gone days. Histories of men and of nations are written in their products, and the artisan of one period can read the history of his art in former ages from the preserved tools and works of the artisans of such ages. Hence the value of museums of art as educators of the people. Of the thousands who visit such museums very few fail to take away with them lessons which influence them unceasingly. The impression made at the moment may be slight and scarcely noticeable, but it is fixed and often potent, betraying its influence in subsequent work. The Metropolitan Museum of Art has had a most wonderful effect as an educator of the people, and every day that influence is manifesting itself in the work of our artisans. It is hard to realize that men who lived ages ago worked at trades or pursued various occupations precisely as we do to-day, and that their products rival those of to-day in artistic workmanship; but the Metropolitan Museum furnishes us with thousands of examples to prove that this is so. Indeed, so artistic and beautiful are some of the antiquities here exhibited, they have served as models for the workmen of to-day to copy, and Dame Fashion has adopted and made them popular. To the jeweler the Museum possesses the strongest attraction, for there he will find beautiful specimens of ancient art in gold and silver work that are full of suggestions and well worth studying. For educational purposes, no collection of antiquities could be more serviceable than the Cesnola Collection. It is, in fact, a vast library of human history in all the arts, extending over a

period of more than fifteen hundred years. The second collection which has been added to the first, includes the Curium temple treasures of gold, silver, alabaster and bronze. The true value of all art collections is their record of the things men have made because men wanted them, and the story they tell of the comparative knowledge of the human race in different ages and under varying conditions, as well as of the relationship between different peoples and successive ages. The Cypriote collections have been of incalculable value on this account. Cyprus was for a long time Phenician. The Phenicians were the great merchants of the old world before and during the rise of the Greek civilization. They bought the art products of all the world and sold them to all the world, and became manufacturers to supply the demands of the world. So every acquisition of ancient art objects, Egyptian, Assyrian, Greek, is certain to be related to more or less of the objects found in Cyprus, which are the products of a long period, of more than fifteen centuries. The entire art history, which is the history of human civilization, from the Christian era back to the remotest periods, is related to the Cypriote collections, and they form an essential part of the complete history.

There are two table cases in the Metropolitan Museum that are especially worthy the study of practical jewelers. They contain a small but invaluable collection of Babylonian and Assyrian objects recently obtained by Dr. Ward in the valley of Asia, the cradle of civilization. Among them are several which, in their expression of ideas, taste and all they tell about the men and women of Babylonia, are identical with objects found in the treasure chamber of the Curium temple in Cyprus. The interesting things taught by the coming together of these objects in New York would be worth writing about in a volume. Not only did the ladies of Cyprus wear jewels in identical form with those which the Indies of Babylon then wore, or had worn, but the dead were buried in both countries with like golden diadems on their foreheads. Goldsmiths made lovely ear rings and ladies wore them thousands of years ago, and no modern craftsman can make more beautiful. Indeed, the forms and styles of those craftsmen of old are to day imitated by the workers in precious metals to satisfy the demands of modern fashion. But what most impresses the visitor to the Museum is the effect these objects produces upon the spectators. Here, surrounded by thousands of art objects of the ancient times, men learn to appreciate the verity of those ancient days, and to realize that the men who then lived were of the same race, had the same thoughts and ambitions as the men of to-day, and that they gave expression to those thoughts and ambitions in the products of their hands. Innumerable lessons are here taught of the oneness of the blood of men in all ages and all countries. Every museum of art in the world teaches this same truth, and if it can only be through them impressed upon all men, they are worth far more than their cost. But they have, also, an inestimable value as educators of the masses, especially of those persons who are engaged in art work.

Gossip of the Month.

CONGRESS assembled December 6, and the President promptly submitted his annual message, which was generally well received by the country because of the many practical business suggestions contained in it. Among other things, he recommends extending our business relations with various foreign countries, and making treaties with them that will secure greater privileges to our manufacturers and exporters. He especially recommends the establishment of closer business relations with Mexico and various South American countries. These suggestions will be heartily endorsed by the practical business men of the country, who have long felt that the commerce of this continent by rights belongs to the enterprising men of the United

States, and that whatever national legislation is necessary to place them on an equality with the manufacturers of Europe in disposing of their products in those countries cannot be had too soon. It has long been known that the Mexican and South American trade would by preference come to this country provided our merchants could compete with those of European countries, whose governments take pains to foster and assist foreign trade. Our manufacturers need new markets for their products, and they have a right to expect that the government will do at least as much towards securing them as other governments do. They do not ask any special favors from the government, only that they shall not be discriminated against. The President's recommendations, so far as they relate to ordinary business matters, are very generally approved.

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THE most important report submitted to Congress by the head of a department was that of the Secretary of the Treasury, who also makes some valuable suggestions from a business point of view. Among other things, he deprecates the accumulation in the Treasury of an annual surplus, which, he says, has been nearly \$125,000,000 a year for the past seven years. Of course, this immense accumulation represents an unnecessary taxation placed upon the industry of the country, embarrassing all transactions to just that extent. The following sentences from the report of the Secretary are deserving the attention of every citizen:

To continue our present surplus taxation, and to employ its proceeds now or for some years to come in giving to the bondholder any such or still higher premiums by anticipatory purchase of those bonds before they are due and payable at par, is a fiscal policy so unnecessary, extravagant and merciless to the industrious toilers of our land, from whose earnings, profits or capital are deducted and taken all the revenues of the Treasury, that I cannot presume their representatives in Congress would let stand any law devolving upon the head of this department such a thriftless task. * * * The taxes to be first remitted are those which prevent or hinder the sale of our surplus products in foreign markets. Their removal will set capital in motion by the promise of better returns, enlarge the steady employment and increase the annual income of many thousand wage-earners, whose prosperity will diffuse prosperity. These taxes are the duties on raw materials, and the most widely injurious of them is the tax upon raw wool.

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A SUBJECT that is now attracting the attention of financiers, and in which the general public has a vital interest, is how to provide for the continuance of the national banks. Government has been calling in so many of its bonds, which form the basis of security of the national bank circulation, that the banks find it an expensive thing to maintain in the Treasury the amounts required to guarantee their circulation, as required by law. As a consequence, the banks are gradually reducing their circulation and withdrawing their bonds from deposit proportionately. The question is as to what other security than government bonds can be substituted as a guarantee of the circulation of the national banks. While we have no desire to take part in this discussion, we can bear testimony to the fact that the business men of the country have become so used to the national bank system, and are so completely satisfied with the security of it, that they would not willingly see it abandoned. They have no desire to see the banks return to the old system of State banks, which authorized a maximum issue of notes with a minimum amount of security. The national banking system, the outgrowth of the necessities of the war, has proved to be the safest and most convenient system of providing a paper currency of any known, and the people will demand its continuance upon a basis of equal security. The many disasters that occurred under the old system of State banks are too fresh in the memories of business men for them to ever wish to see our paper currency again established on such an unsatisfactory basis.

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THE jewelry trade has every reason to be satisfied with the fall and holiday trade of the year just closed. After the settlement of the

great labor demonstrations of the spring trade began to improve, and as autumn approached it became quite active, continuing so to the close of the holiday season. While manufacturers in general were kept busy, those who had attractive specialties were driven to their utmost capacity, often working overtime with all the hands they could get. Among other indications of unusual activity were the advertisements in the want columns of the daily papers for workmen in different branches of the jewelry business. When workmen are in such demand that those desiring their services have to advertise for them, it is a sure indication that the factories are generally running full handed, and that there is unusual activity in the business. The holiday goods offered this year were especially attractive, embracing many novelties in both designs and workmanship. Everything in the line of precious stones were eagerly sought for, and it is stated by those familiar with this branch of the business that the sales of diamonds and other valuable stones during the year just passed were never equalled in an one year in this country. While jewelers generally are felicitating themselves on the results of the business for 1886, they are also confidently looking forward to a prosperous business in 1887. The outlook at present is highly promising, and unless some unforeseen disaster comes upon the country, there is no reason why the activity with which the year closed should not be extended into the spring. All kinds of business is prosperous, there is plenty of money afloat, no stringency in any direction, but instead a universal desire to keep money rolling. Dry goods merchants and importers were never so depleted in their stocks as at the present time; usually they carry over millions of dollars worth of goods from one season to another, but this year they cleared out their warehouses to such an extent that many of them were closed entirely and the insurance cancelled. An insurance paper stated recently that the amount of insurance now being carried on goods in warehouses was less by many millions of dollars than at any time in many years. This indicates the extent of the demand in this line during the fall months, and also gives assurance that the dry goods men are doing their best to replenish their stocks for the spring trade. Indeed, reports from manufacturing centers are to the effect that the factories are busily engaged in filling orders for spring and summer goods to an extent that gives employment to all the workmen that are willing to work. The dry goods trade is generally regarded as an index to the condition of other branches, and the testimony is concurrent that it is most promising at the present time. It is safe to assume that, barring the unexpected, the jewelry trade will open actively in the spring and give satisfactory results during the year.

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SPEAKING about insurance, we announced some time ago that all the insurance companies doing business in New York city and vicinity, 157 of them in all, had signed a compact to limit the amount of commissions to be paid to brokers to 10 per cent., and absolutely prohibiting them from dividing their commissions with their customers. All brokers were required to sign an agreement to this effect in order to obtain recognition from the companies. The Metropolitan Association was organized in accordance with this compact, and notwithstanding the fact that the brokers did their best to defeat the organization, it has become firmly established and now controls the situation completely. Several brokers who were detected in dividing their commissions with their clients were summarily expelled, which means that none of the companies will do business with them any more, and thus they are driven from their occupation. The Metropolitan Association is engaged also in fixing rates for all classes of risks in the district, and this means usually a slight advance in rates; perhaps it is more correct to say that it means an equalization of rates, whereby some risks will be charged more and some less than heretofore, but generally more. On the whole, the movement should be approved by the business community, for it places the

business of fire underwriting on a better footing, thereby improving the character of the indemnity furnished, and relieves them from paying tribute to the brokers to the extortionate extent that they previously did, when these middlemen were receiving from 30 to 50 per cent. of the premiums paid by the insurers. With this item of expense reduced to the minimum the companies will be in a position to reduce rates to property owners, but whether they will do so or not is another question. As things stand now, no company can write a risk at a less rate than any other company, so that property owners need not ask for cut rates any more or for a division of broker commissions. "Combines" for improving business conditions and methods are all the rage now, from Knights of Labor to insurance companies, and from pork packers to "boodle" aldermen. The jewelry trade is about the only one that offers no opportunity for such a combination.

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THERE is a decided opposition manifesting itself among workingmen to the methods pursued by the leaders of the Knights of Labor, and this opposition found expression last month in the convention of trades union delegates, representing a large number of organizations in different trades. A split in the ranks of the Knights was inevitable whenever the workingmen should take time to look into the matter. It was patent to any one that no single organization could exercise absolute control over all the trades and occupations without doing injustice to most of them. When the Knights assumed to adjust all difficulties that might arise between employers and employed, upon the great railroad systems of the country, in the shoe and cotton manufactories of New England, equally with the common laborers in the pork and beef killing and packing establishments, they entered upon an undertaking that the wisest statesmen of the country would have shrunk from. Disruption could not be avoided and it has come in the shape of the protest of the trades unions. If the workingmen will form organizations within their respective trades and callings, and limit their operations to such matters as affect themselves directly in such occupations, they will meet with encouragement from their employers, but no employer will consent to be dictated to by men who are strangers alike to him and to the requirements of his business. As a rule, employers are always ready to listen to the grievances of their own workmen, and are more willing to treat with them than they are with outsiders who may obtrude themselves into the negotiations. The best kind of trade organizations are those composed of the employees of one employer, managing their own affairs in their own way, and limiting their interference to what concerns their own shop or factory. With such unions employers are always ready to treat on a basis of equity and justice to themselves and their employees. But the dictation of a mob invariably raises the spirit of opposition to injustice that every man possesses, and prolonged hostilities result. There has been a strike in progress for many weeks among the employees in the knit goods mills of New York and Connecticut, which has already cost the workmen hundreds of thousands of dollars in wages lost and expenses incurred, and defeat now stares them in the face, with the added certainty that but few of them can ever be restored to their places that have been filled by other workmen. The origin of the difficulty was trivial, and but for the interference of the Knights of Labor would have been confined to one mill, and probably been satisfactorily arranged. But when men who knew literally nothing about the business undertook to coerce the employers they very soon made a muddle of it, as they have in every other instance where they have interfered. When workingmen learn to rely upon themselves rather than to trust to professional agitators and non-workers, they will get justice at the hands of employers.

SOME time ago a disastrous fire occurred in a little town in Galicia, destroying the stocks of many merchants. It was found that their creditors in Lemberg were heavy losers for the reason that the burned out merchants carried no insurance. So a meeting of the Board of Trade of Lemberg was called, and a resolution was passed to the effect that hereafter no credit would be given to dealers unless they could show that they were fully insured. That is an example that ought to be followed everywhere. No dealer who buys goods on credit has a moral right to imperil the interests of his creditors by neglecting to insure the property entrusted to him by them. In this country especially, where the losses by fire exceed those of any other, this rule should be rigorously enforced. The fire losses in the month of November were \$10,000,000, an increase of \$2,500,000 over any November since the great fire in Boston, which occurred in November. The fire losses for eleven months to December first, amount to \$105,000,000, all of which is a clear and absolute waste of the wealth of the nation, fully as much as if that amount of gold had been sunk in the ocean. Somebody has to make it good, and too often the creditor class has to stand more than its fair proportion. Had this property all been insured, the loss would have been, through the medium of the insuring companies, more evenly distributed, for they would have recouped themselves by raising the rates on the property that does not burn. Only about 60 per cent, however, of the property burned is covered by insurance; but whether insured or not, creditors are pretty sure to suffer when the property of their debtors is destroyed by fire.

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AN EXPERT jewelry thief named Edward Wall, with a choice selection of aliases, was captured recently by detectives of this city. He had been successful in stealing a variety of valuable goods from different jewelers in this city and elsewhere. His plan was to go into a store and ask to look at diamonds, and while pricing them would contrive to abstract one or two, sometimes leaving a worthless imitation in place of a valuable stone, so that the jeweler would, at a superficial glance, think that the number of gems placed before the customer were all there or accounted for. Several dealers from whom he had stolen goods aggregating many hundred dollars in value, fully identified the thief, and he was held to answer. He stands a most excellent chance of retiring from active life again, he having already done service in State Prison. This plan of robbing jewelers has been much in vogue of late, and the trade is cautioned to be on its guard in dealing with strangers who wish to look at valuable goods. These dummy stones and the red pepper game have been the means of heavy losses to jewelers in the past six months, and there are a number of expert thieves going about putting them in operation wherever they can make the opportunity.

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THE announcement is made that the Union Pacific Railroad Company is about to adopt the twenty-four hour clock plan of indicating time on its road, and that the clocks are now being prepared for them. This may do well enough for this particular road that traverses half the continent, but we apprehend that it will be a long time before twenty-four hour clocks come into general use. Men are creatures of habit, and it is a difficult matter to make a radical innovation upon established habits and prejudices. With a change of clocks to the twenty-four hour standard, there must come, of necessity, a change also in watches, and it will take much persuasion to wean the people from their affection for twelve-hour timepieces. Twenty-four hour clocks and watches have been known for many years, but they are regarded more as curiosities than as practicable timekeepers. There is much to be said, however, in favor of this system of marking time; in fact, the only real objection to it is the

popular prejudice in favor of the other plan. If we had been educated to and brought up on the twenty-four hour standard we should all regard the attempt to introduce twelve-hour timepieces as a great innovation. Should the other railroads fall in line with the Union Pacific, the revolution would be virtually accomplished, for railroads are such an important factor in modern civilization that everybody has to conform to their requirements.

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constantly. Old houses are making every preparation to take care of this increasing business, leasing additional telegraph wires, adding to their clerical force and in every possible way extending their facilities for doing business. They expect 1887 to be a busy year for them, and they wish to be ready for the shearing as fast as the "lambs" make their appearance. It is to be hoped, in the interests of legitimate business, that there will not be sprung upon us an epidemic of speculation, in which men lose their wits as well as their money. Men engaged in honest occupations, and indebted to others for any portion of their stock or their capital, have no more moral right to gamble in stocks than they have to "buck the tiger" in a regular gambling establishment. They have only a part interest in the funds they handle, and they have no right to risk it without the consent of the other parties in interest.

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A SPECIAL agent of the Treasury department recently seized in Chicago a box of jewelry alleged to have been smuggled into this country by S. S. Costikyan, who, with his brother, keeps a jewelry store in Chicago and another in Rochester, N. Y. According to the story of Costikyan, he purchased the jewelry in Constantinople two years ago, and it consists of some mechanical pieces ordered by the Sultan of Turkey for one of the favorites of his harem. One piece is in the shape of a gold bug about two inches long, studded with diamonds. By touching a spring the wings of the bug expand, disclosing a diminutive watch of excellent workmanship. Another spring opens the under side of the bug, revealing the works of the watch. This fanciful timekeeper is valued at \$450. Another piece consists of a large pearl, fashioned to represent a squirrel, having a tail made of gold, which is valued at \$250. There is also a beautiful diamond ring which is very valuable. Mr. Costikyan says that these articles were found by him in a jeweler's shop in Constantinople, and that having purchased them he succeeded in eluding the vigilance of the New York Custom House officials. Now he will, no doubt, not only have to pay duty on them, but submit to a heavy fine for defying the laws of the country.

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A foreign exchange thus speaks of a masterpiece of the goldsmiths' art that has recently been produced in Berlin: The work is a gorgeous diadem for the Empress of Japan, who has also had a necklace in brilliants and several bracelets prepared at the same time. At the Japanese court it has not hitherto been customary to wear diamonds. Pearls were used, the rarest and costliest of which have never come to Europe, but have been kept at Oriental courts where they have brought the highest prices. The value of the ornament is several hundred thousand marks. The diadem is made up of 600 brilliants, crowned by 9 splendid solitaires, the central one of which weighs nearly 21 karats, and is of itself worth 20,000 marks. These solitaires can, by means of a simple piece of mechanism, be removed and replaced by nine stars in brilliants, which, when not so used, can be employed as hair pins and brooches. The necklace, a triple *Rivière*, consisting of 140 brilliants, has a dazzling appearance by reason of the luster of its large stones, whose collection and arrangement have been a work of great difficulty. The bracelets are of solid gold, without precious stones.

How to Become a Skilled Optician.

[EDITED BY C. A. BUCKLIN, A. M., M. D., NEW YORK.]



COMMENCE this series of practical lectures knowing that many of my readers have never paused to think for a moment on the subject of light and the phenomena produced by its refraction. I therefore consider it absolutely necessary to be as elementary as possible. A passing word is also necessary to those who pride themselves upon being so intensely practical that they do not desire to know anything of the theory which is underlying the subject with which they propose to be practically familiar.

I have found, as a matter of practical experience, that it is impossible to understand the queer conditions you meet with in experimenting with lenses to improve vision without a theoretical knowledge of the laws of refraction and the nature of light. We must imagine light to be an ether. The luminous point from which its undulations radiate is best illustrated by the circular undulations caused by a stone falling upon a smooth surface of water. The light waves are, however, not confined to one plane as in the water; they radiate equally in all possible meridians. The velocity of light is in round numbers 186,000 miles per second. The sound wave has a velocity in the air at 32° F. of 1,091 feet. It is thus seen that distance can be calculated with some degree of correctness by counting the number of seconds which elapse from the flash of a *gun till the report is heard*.

Refraction by Plane Surfaces.—When a ray of light strikes a plane surface of glass or water at right angles to the surface it passes through the medium without deviation from its original course, the only effect being to diminish in some degree the intensity of the light. When a ray of light falls upon a plane surface at any other than a right angle it is deflected from its original course, although the light remains in the same plane the plane is bent or deviated. This is called the refraction of light by plane surfaces.

Index of Refraction.—Different media do not deflect the light equally in its passage obliquely through them. The angle at which a ray of light strikes the water is the angle of incidence, and is measured by the angle formed by a perpendicular line drawn at right angles from the point of contact of the luminous ray with the plane surface of the refracting medium.

A ray of light passing from a rarer into a denser medium will be deviated toward a line passing through the medium at right angles to its surface and at the point of contact of the incident ray.

A ray of light passing from a dense to a rare medium is deviated away from this perpendicular or in the reverse direction. This is illustrated if you are in a boat and look at a submerged oar it will appear bent upward, while if you were in the water under the oar it would appear bent downward. The oar being in the water, the angle formed by the ray of light with the perpendicular in the air is called the *angle of incidence*. The angle formed by the ray of light with a continuation of this perpendicular after it enters the water is called the angle of refraction.

It is evident that the more a ray of light is deviated in passing through a given medium the greater its refracting power must be. The relation, therefore, existing between the *angle of incidence* and the *angle of refraction* is the measure of the *refractive index*.

Different substances have different refractive indices. Thus, a pebble lens ground in the same shell as a glass lens is usually a little stronger than a glass lens. While a lens ground from a diamond would be nearly twice as strong as a glass lens ground in the same shell.

Having thus disposed of the usual stumbling blocks to the beginner, "refraction of plane surfaces," "angle of incidence," "angle of refraction" and "refractive index," we are in position to consider some of the phenomena of refraction of light as it takes place in transparent substances, the surfaces of which are not plane.

The simplest form in an optical instrument is a wedge of glass commonly called a prism. All rays of light passing through it are bent toward the thick edge of the prism.

For the purpose of demonstrating the effects which different surfaces ground upon glass have upon the passage of light through them we will use a box, one side of which is glass; this box is filled with smoke. If we place two prisms with the thick edges before the opening in the end of the box, then allow a ray of light from a distant lamp to pass through these prisms into the smoke, the light will appear in the smoke as a perfect luminous wedge. If four prisms are placed before the opening, their thick edges joining and the lines joining the thick edges being at right angles to each other, the cone of light will appear as a luminous pyramid.

In the first instance, if there is a piece of ground glass at the termination of the wedged-shaped luminous cone the focus will appear as a single luminous line, while in the instance of four prisms being used, the common focus will appear as a luminous point. The first instance illustrates the effect of a simple convex cylindrical lens upon the passage of light through it, while the second instance illustrates the effect of a compound convex cylinder with axis crossed at right angles.

A simple convex lens, if placed before the opening of our smoke filled box, will cause the light to assume the appearance of a luminous cone if viewed endwise at the point of focus as it falls upon a ground glass, the focus will appear a minute point. It is thus seen that a convex lens has the same effect upon light as an innumerable number of small prisms with the thick edges all joined in a common center.

A concave lens has the same effect on light as an innumerable number of prisms with the thin edges all joined in a common center. A concave cylindrical lens has the same effect on light as two prisms, the thin edges of which are joined. A compound concave cylindrical lens with axis crossed at right angles, has the same effect upon light as four prisms, the thin edges of which join each other, the joining lines of each pair being placed at right angles.

The theory of vision is best illustrated by the photographer's camera; the silvered plate represents the retina, the dark chamber represents the vitreous chamber and the lens system represents the cornea and lens of the eye. A still more simple means of illustrating the theory of vision which is within the reach of every individual is a convex lens, No. 12 to 5, and a sheet of white paper. If a ray of light is allowed to enter a darkened room or box through a small opening before which a convex lens is placed, a sheet of paper then being held behind the lens, a point will soon be found where a clear inverted picture is formed of the outside surroundings. This is exactly what takes place in the human eye. In our experiment every time there is any decided change in the distance of the observed object, the paper upon which the image is received must be moved to a corresponding degree before the object becomes distinct. This difficulty is compensated for in the eye by a muscle surrounding the lens, which can increase its power to any desired degree to compensate for the changes in distance.

If we take a sharp razor and make a clean horizontal section of an animal's eye you will at once be able to locate the position of the optic nerve, the three coats of the eye, the vitreous chamber, the crystalline lens; the slight ridge around it is the ciliary muscle by which the strength of the lens is increased as desired. The pointed dark processes surrounding the ciliary muscles are known as the ciliary processes. This demonstration of the anatomical structure of the eye and of its striking similarity as an optical instrument to a camera obscura, is exceedingly gratifying to the mind of an individual sufficiently interested in this subject to follow it as a calling.

Another very astounding and interesting experiment with the eye of a large animal is to carefully remove all coating from the posterior pole of the eye, place the eye in an opening which admits light into a darkened room, and by carefully selecting the proper position for

a piece of ground glass at the posterior pole of the eye, we are able to demonstrate the retinal image on the ground glass.

Considering the fact that it is only within the past thirty years that it has been generally understood that hyperopia, or far sight, is due to a short eyeball, that myopia is due to the eyeball having an excessive diameter in the line of its optical axis, and that astigmatism is due to unequal curves of the cornea in its different meridians. No science has made more progress than that of optics as applied to the improvement and relief of the infirmities of man.

In answer to inquiries regarding class, which is to meet on January 20, I will state: The instruction will be given in form of a lecture one hour each day, excepting Sunday. Then there will be at least one hour each day spent in examining patients, the examinations being made by the students. The balance of the day will be spent by the students in reading up the subjects considered and the abnormal conditions found in the patients examined. The course will be entirely completed in two weeks.

I publish the following peculiar case received from one of our Canadian readers.

Case I.—Age, 72. Sex, male. Occupation, hunter. Active outdoor life. Health good. Apparent age, about 60 years.

Complains only that at distance of 40 feet or so cannot distinguish one face from another.

Forty years ago a stick struck L. E. ball; not much hurt and got quite well in a short time. Fifteen years ago a film appeared and gradually spread over L. E. until the pupil was nearly covered. On the application of *hog's lard* the film disappeared. No bad effects apparent. Sight has always (except during the temporary disability spoken of above, which was of short duration) been excellent for his time of life. Wore glasses at intervals since 30 years ago or thereabouts. Eyes gave no trouble so far as disease or injury was concerned. Glasses heretofore used were convex.

Then sight grew so unsatisfactory he had to quit using rifle, and although there was no change in general health or any other cause that he was aware of, sight got so good again that use of rifle was resumed and eyes were good as ever.

Within the last three years sight grew unsatisfactory once more. He suddenly discovered that although by daylight he could see very well, yet by night, moonlight, gas or lamplight, he could not *see anything* more than a very few feet off, six feet or so, and could only tell the indistinct forms of objects nearer than that.

Could see flame of lamp or other light. *No halo*. Yet light was very dim. This lasted from 7 to 12 days at a time and recurred three times.

In recovering night sight HE noticed openings in what appeared to be a curtain or film INSIDE his eyes that obscured the light. The curtain or film would gradually break up and disappear leaving his sight as good as usual.

Tested at 20 feet.

D. V. $\frac{2}{3}$

—30 lenses give best vision at 20 feet, making it NEARLY normal.

—30 lenses improves far D. V. considerable.

Without lenses he sees ornamental spires, about $2\frac{1}{2}$ feet high and 3 or 4 inches thick, on a roof one mile away.

+ lenses make V. worse.

Reads newspaper print with ease without lenses at 16 inches.

Slightly astigmatic in both eyes, black lines horizontal, but astigmatism not very marked.

Is not this a peculiar case?

The first complaint is explained by the fact that he is at the present time slightly *near-sighted*.

The film referred to was an attack of "interstitial keratitis." All the possibilities described in this peculiar case can be referred to certain forms of intra-ocular inflammation which, after first having obscured vision, disappeared, leaving the globe sufficiently softened to stretch under pressure and become myopic in later years. Although this case, as described, has many striking peculiarities, I

think they can all be explained upon the above hypothesis. It is, however, difficult to state whether this intra-ocular inflammation had its origin in a constitutional cachexy or was the result of the injury received. The former is, to my mind, the most probable.

The Diamond Mines of New South Wales.



THE FOLLOWING report by consul G. W. Griffin, of Sydney, N. S. W., is published by the state department in its pamphlet for December: Although diamonds have been known to exist in various parts of Australia for the last thirty or forty years, no serious effort has ever been made to conduct any systematic mining operations for them except in the colony of New South Wales. I regret not to be able to give the exact period at which diamonds were discovered in Australia or when their value first became known. It is certain, however, that for a considerable period no importance was attached to their discovery on account of their small size, and also from the prevailing opinion that they were only a species of colorless topaz.

The Rev. W. B. Clark, in a valuable paper on the mineral resources of the colonies, makes mention of the discovery of diamonds on Macquarie River in New South Wales in the year 1860. No mention, however, was made as to their size or value, or of the conditions under which they were found.

In 1867 attention was directed to the discovery of diamonds on the Cudegong River, also in the colony of New South Wales, about 20 miles from Mudgee and 170 miles from the city of Sydney. In the same year their discovery was reported at Beechwood, Victoria, and in various localities amongst the gold-bearing reefs of South Australia.

Professor Liversidge, of the Sydney University to whom I am principally indebted for the material of this report, has given much thought and study to the occurrence of diamonds in Australia. He visited the mines at Bingera in 1873, and has ever since taken the deepest interest in the progress of the work there.

THE MUDGEE MINES.

Amongst the material placed at my disposal by Professor Liversidge is a very valuable paper entitled "The Occurrence of the Diamond near Mudgee," by Mr. Norman Taylor, of the Victorian Geological Survey, and Prof. Alexander M. Thomson. From their paper I learn that diamonds were first seen in the Mudgee district, at a place called Two-Mile Flat. Little attention, however, was paid to the discovery until the spring of 1869, when the search was taken up briskly by the Gwydir Mining Company and by several independent parties. The localities producing the diamonds are situated along the Cudegong River, beginning at the junction of the river with Waldra Creek and extending to Hassal's Hill, a distance of 7 miles. They are said to be more numerous in the outliers of an ancient river-bed. These outliers occur at various distances from the present channel, and at elevations of about 40 feet above it. Mr. Taylor and Professor Thomson state that these outliers of drift are capped by hard, compact, and, in many instances, columnar, basalt. They have all the characteristics of the widespread deposits in Victoria, which the Geological Survey there has been accustomed to assign to the older Pliocene. The patches of diamond-bearing drift (older Pliocene) with their protective coverings of basalt, though once forming parts of a continuous deposit, have been isolated by extensive denudations. The point of eruption from which the basaltic flow emanated appears to lie to the eastward, but it has not hitherto been detected. Its remnants can be followed up for at least 19 miles along the river, in some spots still showing a thickness of 70 feet, which proves the igneous outburst to have been of consider-

able magnitude, sufficient to alter materially the physical aspects of the river valley.

The various outlets of the older Pliocene drift containing diamonds are enumerated and described by Mr. Taylor and Professor Thomson as follows :

(1) The dimensions of the first area cannot be fairly estimated, as much of the basalt has been covered up by various surface accumulation. It lies partly on private ground and has been insufficiently explored ; 100 acres might be taken as an estimate of the working as far as yet developed.

(2) Jordan's Hill : Three miles below, on the left bank, a triangular basaltic area of about 40 acres.

(3) Two-Mile Flat : Three miles below the last, at some distance on the left bank, comprising five basaltic knolls and ridges at various intervals along a large elliptical curve that the old channel followed, but which the present river has cut off. Computed altogether at about 70 acres.

(4) Rocky Ridge : On the right bank, 1 mile below Two-mile Flat, a scarped basalt hill, extending a short way up a tributary creek. About 40 acres.

(5) Horseshoe Bend : On the left bank, opposite the Rocky Ridge, a crescent-shaped area of basalt, with its concavity facing the river. About 20 acres.

(6) Hassall's Hill : A similar crescent area, with its convexity towards the river, situated half a mile southwest of the Horseshoe, and covering about 340 acres.

The drift rests on vertical indurated strata, or on massive greenstone. Diamonds have been found in a younger drift, occurring at a lower level, containing decomposed pebbles of basalt. Mr. Taylor thinks that the diamonds in this drift have been washed out of the older deposit. Diamonds have also been extracted from the water holes in the river, but whenever this occurs the older Pliocene drift has been discharged there by the diggers when gold was the object of their search.

The following is a list of the gem stones and heavy minerals found in the drift : (1) Black vesicular pleonast ; (2) topaz ; (3) quartz ; (4) corundum ; (5) zircon ; (6) tourmaline ; (7) black titaniferous iron sand ; (8) black magnetic iron sand ; (9) titanite, probably brookite, in flat red, transparent, or reddish-white translucent plates ; (10) wood tin ; (11) garnet ; (12) iron slag, fragments of slightly rusted iron ; (13) gold, fine, scaly, and occasionally fragments inclosed by quartz ; (14) the diamond itself is distributed irregularly through the older Pliocene river drift.

At Hansall's Hill 33 loads from one claim yielded 306 diamonds. Another claim yielded at the rate of 8 diamonds to the load. Out of 5,000 or 6,000 diamonds found, very few were of any considerable size, the largest being a colorless octahedron, weighing $5\frac{3}{8}$ carats. It was found in the river, between Two-Mile Flat and the Rocky Ridge, at a spot where the older Pliocene drift had been discharged in gold washing. A majority of the stones were pellucid and colorless, many were straw-colored and a few of dark green and black. Those engaged in mining for the gems were obliged to give up their work on account of the scarcity of water and the heavy expense incurred in extracting the drift from the basalt. The method adopted by them in washing for the diamonds, when water could be obtained, consisted in screening the drift so as to separate the larger stones. The coarser portion of the clay was then raked aside, so that the gold and finer matter could be carried away by a stream of water flowing through an iron grating on the water-blankets below. One of Hunt's ore-separating machines was used to separate the heavier from the lighter material that passed over the blankets. After the reduction of the material by this process, the diamonds were readily distinguished.

Water is now said to be more abundant than formerly in the Mudgee district, and a new company has been formed for the purpose of conducting operations on an extensive scale. The company, it is said, will be supplied with the latest improvements in machinery and diamond mining appliances.

THE BINGERA MINES.

The Bingera diamond mines are located on the Gwyder River 8 miles from the town of Bingera and about 350 miles northwest of the city of Sydney. The route there is by steam to Newcastle, a

distance of 60 miles, and thence by railway to Tamworth, 200 miles, and the remainder of the journey is performed by coach.

According to Professor Liversidge, the Bingera diamond deposits are situated in a kind of a basin or closed valley amidst the hills. The basin is 4 miles long and 3 wide, and opens toward the north. Running into the valley are various spurs of basalt, covering portions of the drift. The drift is 30 or 40 miles in length, and is thought to be the forsaken bed of the river Horton. The rocks upon which the diamond drift rests consist of argillaceous shales. In one part of the ground the shales are joined by silicious conglomerates, and there the diamonds are most abundant. The pebbles and bowlders consist of various-colored jasper, white quartz, black flinty slate, etc. I append hereto a list of gem stones associated with the diamond at Bingera, furnished me by Professor Liversidge.

GEM STONES ASSOCIATED WITH THE DIAMOND AT BINGERA.

(1) Tourmaline, or jet-stone, occurs as rolled prisms, usually from one-fourth to three-fourths of an inch long. They usually retain the trigonal section, but occasionally no trace of crystalline form is left, and they appear merely as more or less rounded black pebbles, often with a pitted surface, totally unlike the usual appearance of tourmaline. The blow-pipe decides their character at once. These black jet-stones are invariably found with the diamond, and are regarded by the miners as one of the best indications of its presence.

(2) Zircon occurs in small crystals of red and brown colors, also nearly colorless, but more commonly as rolled pieces of a brown shade. A cleavage plane is usually to be seen.

(3) Sapphire, generally in small angular pieces, and usually of a pale color. In many the blue tint does not overspread the whole of the fragment. The ruby is present, but very rare. One fragment showed the faces of an acute hexagonal pyramid and basal pinacoid. The lower half of the crystal had been fractured. The fragments of sapphire are far less in size than those found at Mudgee and in New England, and far less rolled. The major part often appears to have undergone no rounding at all, thus showing a broad distinction between it and the gem sand at Mudgee.

(4) Topaz, as rounded fragments, and sometimes with rough crystalline outline. They are generally of a dull yellowish color.

(5) Garnet in small, rough-looking, ill formed crystals of a dull red shade.

(6) Spinelle, not very common ; generally in small red or pinkish fragments.

(7) Quartz, small prisms, capped, with the pyramid more or less rolled ; transparent, of a pale red, smoke color, etc. Amongst the jasper pebbles are some of pale mottled tints of yellow, pink, drab, brown, bluish gray, etc. These are termed "morlops" by the miners, and are regarded by them with much favor, as they say that they never find one in the dish without diamonds accompanying it. The average specific gravity of the morlop is 3.25, nearly the same as that of the diamond ; hence the reason of their being found together. They are oval in form, smooth, and rarely exceed a quarter of an inch in length. The miners are unable to tell how the name originated, and there is no mention of it in any work on mineralogy.

(8) Brookite, small flat fragments, very rare.

(9) Titaniferous iron, rather common.

(10) Magnetic iron ore, in small grains, showing an octahedral form under the microscope ; coated with hydrated sesquioxide of iron, easily removed by the magnet. Gold in small particles was often found attached to the grains of the magnet.

(11) Wood tin ; rare, in small rolled particles.

(12) Gold ; fine grains and scales present, but in small quantity, and the greater portion attached to the magnetite ; hence the magnet was used for removing it.

(13) Osmiridium ; in small, brittle plates ; rare.

(14) Diamonds ; small size, clear, colorless, and transparent, while others have a pale straw or yellow tint. One or two small size of very dark color have been seen ; also a green one. Nineteen speci-

mens were examined, and their specific gravity found to be 3.42, that of the Mudgee being 3.44. In some the crystalline form is distinctly shown, but a number of others have rounded faces.

The following table shows that the yield of the Bingera diamond drift is about twenty diamonds to the ton.

Table showing the yield of the Bingera diamond drift.

| | No. of diamonds. |
|-----------------------------|------------------|
| 6 tons of drift..... | 41 |
| 4½ tons of drift..... | 143 |
| 6 tons of drift..... | 88 |
| 6 tons of drift..... | 125 |
| 6 tons of drift..... | 163 |
| Refuse from the machines .. | 41 |
| Total..... | 690 |

In 1873 diamonds were discovered at Bald Hill, in the Touron district. Three stones obtained there were sent by the minister for lands to Professor Liversidge for examination. The professor, in reporting upon the same, said that the largest stone was in the form of a six-faced octahedron, rather flattened, owing to four of the groups of faces being more highly developed than the other four. The faces and edges were rounded somewhat, but Professor Liversidge did not think that the roundness was caused by attrition, from the fact that diamonds not unfrequently crystalize with curved faces and rounded edges. The stone was clear and colorless and perfectly free from all visible internal flaws. It possessed a specific gravity of 3.58 and weighed a little over three carats. The diamond next in size possessed the same crystallographic form, but was less compressed. Its weight was 1½ carats. The third specimen weighed about half of a grain, and was of high luster, but imperfect in color.

Accompanying the diamonds were two small boxes of gem sand. None of the gems contained in the sand, except the diamonds, were of any commercial value, except for polishing purposes. The professor stated, however, that they were of great value as indications, for where such occur there is every prospect of finding others of larger size and better quality. The following is his report upon the same:

GEM SAND NO. 1.

In this the following substances were found to be present:

(1) *Corundum*.—When blue this is known as the *sapphire*, and when red as the *ruby*.

(a) *Common corundum*.—Present in small fragments of bluish, greenish, and gray tints.

(b) *Sapphire*.—In small particles of a blue color, some so dark as to appear almost black, and others very light. Some of the fragments still show their crystalline form, viz, a hexagonal pyramid, but most of them do not, and are either much rolled, sub-angular, or angular in their outline.

The ruby is absent, but probably would have been present had the sample of gem sand been larger.

(2) *Zircon*.—Plentiful, usually in the form of much-rolled pieces. Generally of a brown color, sometimes red, and at others nearly colorless. The small and nearly colorless crystals possess a very high luster, almost equal to that of the diamond, so that they might readily, without careful examination, be mistaken for that gem.

(3) *Quartz*.—Usually as small, well-rolled grains, either colorless, milky, or yellowish. Sometimes as hexagonal prisms, capped with the hexagonal pyramid. Jasper of various colors, such as red, yellow, gray, also occurs, together with black grains of flinty slate.

(4) *Rutile*.—In angular fragments, still showing traces of crystallization. Distinguished by its brown color and metallic luster, and by the presence of numerous fine striae on the faces of the prism. It very much resembles tin-stone in appearance. In composition it consists of titanous acid.

(5) *Brookite* also occurs. This is another form of titanous acid. Rutile crystallizes in striated tetragonal prisms, whilst this crystallizes in tabular forms belonging to the rhombic system. It is present in small quantity in the form of flat, irregular plates, brown or gray in color.

(6) *Topaz*.—Present in small rolled and angular fragments, colorless, and in pale tints of yellow and greenish blue. The latter-colored topaz is often erroneously termed the aquamarine.

(7) *Beryl or Emerald*.—Doubtful, but one or two very small fragments resembling it.

(8) *Garnet*.—Small, rough, common garnets, of no value.

(9) *Tourmaline*.—A few rounded pieces, but none showing the crystalline form, which is that of a three-sided prism.

(10) *Gold*.—Present in the form of scales.

GEM SAND NO. 2.

This consists of larger grains than No. 1; in fact they are small pebbles.

(1) *Quartz*.—Present principally in the form of jasper, of various colors, red, brown, green, yellowish, etc.; also variegated. Colorless and yellow quartz pebbles are also found, together with black pebbles of flinty slate.

(2) *Corundum*.—Present as common corundum, and as the sapphire.

(3) *Brookite*.—Same as gem sand No. 1, only in larger pieces.

(4) *Topaz*.—Clear and colorless, also tinted.

Mr. Wilkinson, the government geologist, stated in his annual report for 1884 that he is fully convinced that diamond mining will soon form an important industry in the colony. The mines, he says, would have been developed earlier but for the want of water. He commends very highly the prompt action of Messrs. Falk & Co. in sinking for water at Bingera. Mr. Harrie Wood, under-secretary for mines, in a recent report fully agrees with the views expressed by Mr. Wilkinson in regards to the prospects of the industry. Mr. Wood states that the Australian Diamond Mining Company obtained at Doctor's Creek, Bingera, 1,193 diamonds, weighing 254 carats, when the water gave out. They raised 5,000 tons of drift but were unable to wash out more than 400 tons. The drift was found by Messrs. Powell and party. The Craddock party had a small wash of about a half a ton, which yielded 17 diamonds. Messrs. Dinsey & Co. also obtained a number of diamonds, but had to abandon the drift on account of the scarcity of water. Mr. Wood reports the discovery of diamonds at Fingha, near Big River, Auburn Vale, and at Berrema and Inverell. A few have also been found in the Mettagong, Wellington, and Uralla districts. Those found at Auburn Vale and Berrema were said by London experts to be of the very best quality, superior in every way to those of Cape Colony, South Africa. Mr. Wood is of opinion that the mines at Fingha will eventually prove the richest in Australia. The department is at present engaged in sinking a shaft there which is expected to develop very rich diamondiferous material.

The Australian Diamond Mining Company about eighteen months ago purchased a lease of 40 acres for which they paid \$20,000. They have also incurred considerable expense in the erection of machinery, in sinking for water, &c. As yet no stones of large size have been found by the company, but even at the celebrated Kimberly mines in South Africa, one large stone in 10,000 is the general run, and one-half a carat per ton of drift is considered a good result for a diamond mine. Mr. Wood informed me that he received a telegram a day or two ago from the manager of the Australian Diamond Mining Company at Bingera, stating that they had just cleaned up 87 loads of drift, yielding 1,139 diamonds weighing 209 carats. This is the best yield the company has had. A subsequent telegram states that some of the stones were larger than any which have hitherto been found, and that six men only were employed for a period of ten days in breaking up, carting, and cleaning the drift.

Mr. Wood is of the opinion that these satisfactory results are likely to continue. He also informed me that the department of mines has been endeavoring during the last two years to test fully, by actual trial, the utility of New South Wales diamonds for drill purposes. He said that Mr. Slee, the chief inspector of mines, had recently made a very satisfactory report upon the subject, and that at Heathcoat, near Coalcliff, a Bingera diamond stood the test of boring 1,267 feet through thick layers of hard sandstone and conglomerates, the latter being especially injurious to drills, and yet without the slightest fracture. In order to direct further attention to the diamond industry Professor Liversidge will forward to the Indian and Colonial Exhibition to be held in London during the present year a collection of New South Wales diamonds, among which are the following:

| | Gram. |
|---|-------|
| 1 diamond, tetrahedron, Lachlan River, New South Wales..... | .115 |
| 9 small diamonds, Bingera, New South Wales..... | .335 |
| 1 diamond, dark, in octahedron, Bingera, New South Wales..... | .290 |
| 1 black diamond, mudgee, Bingera, New South Wales..... | .735 |

The professor will also forward a few Cape Colony diamonds for the purpose of comparing their matrix with that of the specimens from New South Wales.

A parcel of Bingera diamonds placed on the London market in September last averaged £1 12s. (\$7.77) per carat, while the highest average of the Cape diamonds during the same month was only 18 shillings (\$4.38) per carat. Another parcel of New South Wales diamonds, weighing 126 carats, brought in London £1 10s. (\$7.29) per carat. These were obtained from 127 tons of drift, averaging nearly 1 carat per ton. A few months previous to this shipment a parcel was sent to London weighing 40 carats, obtained from 80 tons of drift, equal to 2 carats per ton.

The manager of the Australian Diamond Mining Company estimates the cost of washing for diamonds at 2s. 6d. (60 cents) per ton of drift. He states that they can wash easily, with one machine, 200 tons of drift per day, and even if the average should be no higher than 3/4 carat per ton the net profits would be considerable. He is very decided in the opinion that the Bingera stones are far superior to those of the Cape. It will perhaps be of interest to mention here that the geographical position of Bingera is almost identical with that of the celebrated Kimberley mine of South Africa, both being situated on the thirtieth parallel of south latitude. Another striking coincidence is that the coast-line of Bingera bears from northwest to northeast at precisely the same angle as that of Kimberley. There is also a dividing chain of mountains in both places at about the same distance from the coast-line, and moreover the diamonds are located within the chain of mountains in each case at an equal distance from the coast-line. I have thought to mention before concluding this report that the production of the South African diamond mines during the month of July, 1885, was in round numbers, 170,000 carats, valued at 18s. 5d. (\$4.48) per carat. In October, 1882, the production was 211,746 carats which realized £1 13s. 7d. (\$8.16) per carat. From this it will be seen that the tendency of the price of South African diamonds is downward. The production it is said has also been affected by serious falls of reef. It took the various diamond mines of the world two centuries, previous to 1870, to produce fewer diamonds than the celebrated Kimberley district has placed upon the market during the last fifteen years.

The steady decline in the price of diamonds has led to the conclusion that the South African mines have been allowed to produce too rapidly, and this state of affairs, it is said, is forcing the amalgamation of the various diamond companies.

Advice to Watchmakers' Apprentices.

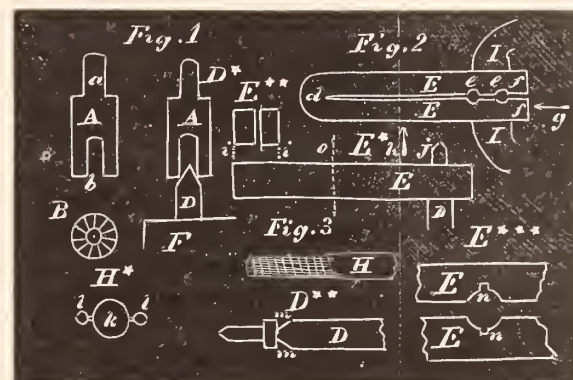
BY A MAN WHO HAS SPENT TWENTY YEARS AT THE BENCH.



GEARED hand drill is something every watchmaker shou'd have, no matter what kind or how many lathes he may own; as there are frequent cases where such a drill can be used to advantage.

I promised in my last communication to tell how to use such a drill in making spec screws. Screws of an intermediate size between watch screws and the size machinists use is not very easy to get hold of, and yet they are exactly the thing almost any watchmaker who has a turn of mind for getting up little original tools and machines need. A very useful size of screw is made from a wire a trifle larger than 1/8 (say an eighth and a sixty-fourth) of an inch. In such a screw the screw parts would be a trifle more than 1/16 thick; and the head the full size of the wire. It should have 48 or 50 threads to the inch. The hollow

drill need not have any sliding sleeve, as was described in last article, but be shaped as shown at *A*, fig. 1, where *a* represents the pin which goes into the drill stock, and *b* the hole into the end of the hollow drill. In using we file the iron wire we are making screws of to a point as shown at *c*, diagram *D**, where *D* represents the iron wire, and *F* a bench vise. To make the blank for a screw we dip the end of the hollow drill *A* (which is supposed to be in our hand drill) into a shallow dish of oil kept for the purpose, and resting the hollow drill on the conical-pointed wire *D*, proceed to turn our drill until a sufficient length of blank is formed for our screw. For cutting the thread on our blank the old cutting pliers is not as good as some other arrangement. The best thing, undoubtedly, is a screw plate with movable dies; but in absence of this we can make a device which answers every purpose. Square steel of almost all sizes can now be bought; but if the reader is placed so such material is not convenient or accessible, have a blacksmith forge a piece of steel 1/4 by 3/16 and ten inches long; this will make two screw plates. It is well to take them from the smith and file them nicely square on the edges and to the size mentioned. Next cut the bar in two pins 5 inches long, and have the blacksmith bend the ends of each together, as shown at *E*, fig. 2. Take them home and file the ends at *ff* so they are even. At diagram *E*** is shown an end view of the two ends seen in the direction of the arrow *g*, fig. 2. File the outer surfaces as indicated at the dotted lines *ii* so they will be true and flat. At diagram *E** is shown a side view of the device seen in the direction of the arrow *u*. This diagram shows our simple screw cutting device as it is applied in cutting a screw, *D* showing the iron vise, and *j* the screw blank. After the screw plate *E*, as we will now call it for the sake of



distinction, is so far complete, we put it in the bench vise, clamping the two arms *ff* tightly together, and drill two holes *ee*. These holes should be some smaller than the screw we intend to cut. If now we take a soft steel tap as shown at fig. 3, and cut graver lines in the direction of its axis as shown, it will roughen the threads and make them cut faster and better. I would beg leave to digress for a moment to say a few words on screw plates and taps. The ordinary screw plate is simply a hole in a sheet of steel in which a female screw is cut, and to produce a screw or tap, we force in by turning a pin of round metal larger than the interior of the hole in the screw plate, and the process of cutting a screw is partly cutting and partly raising a burry thread in excess of the size of the wire on which the thread is cut. With the idea of improving the cutting properties of a fixed screw plate, the better ones have small holes drilled near the one which contains the thread, and these holes sawn through into the larger one, as shown at diagram *H**, where *k* represents the tapped hole, and *ll* the small holes for receiving the chips and holding oil. But no fixed plate, *i. e.*, one which cannot be closed as the cutting progresses, is capable of cutting a deep clear thread. In the present case, if we cut a tap in a common screw plate, and deepen the threads by going over them with a knife-edge file and cutting the graver lines as shown in fig 3, and heat, and harden in oil, we will have a tap for cutting a thread in *E* which will fully satisfy a particular man. By having two holes

at *e e* as shown, we will have in the two screw plate 4 sizes of screws. After the threads are cut in *E* we should make two shallow incisions in each plate as shown at *n n*, diagram *E****, which is an enlarged view of the cutting parts as shown in fig. 2. The incisions *n n* extend the full depth of the screw plate. After the cutting parts are complete the plate is hardened from *f* to the dotted line *o*, fig. 2. In cutting a screw the blank is inserted as shown at *j*, and the plate grasped with a hand vise as shown at *I I*. The plate is unscrewed up on the blank when the jaws of the hand vise are tightened a little, and the plate is screwed down, so on running the plate up and down, supplying a little oil to aid the cutting until the screw on *j* is perfect. Such a plate will admit quite a range of sizes, and the four holes in the two plates will cut $\frac{1}{16}$ to $\frac{3}{16}$. Of course taps can be cut with the same plate for tapping out the female screws to match anything we desire. Regular taps are best for average work filed 3 square. After a screw is cut file 4 notches as shown at *m m*, diagram *D***, which serves the double purpose of cutting off the screw and pointing *D* to again take the hollow drill as at diagram *D**. If one takes 3 pieces of wire and points each end, and drills a blank on each end of each piece, then cuts screws on them, in two operations he will have a dozen screws in a very few minutes. Some persons may fancy this is a very slow old fashioned way, but I have practiced making my own screws for some years and know it is, all things considered, the quickest, and certainly the best way. No screw ever strips or gets away when put in on this system, and no time is spent in hunting up a screw to fit; select a tap of the right size, tap out the hole, and then you know exactly what size screw you want. I have been latterly writing up the subject of spectacles and eye glasses in particular, and before I close this subject would call the readers' attention to a point I urged early in these papers, and that is, *order* and system. We do not need so very many tools for this branch of the jewelers' trade, but we require special tools, and let these be so arranged we can put our hands on them instantly. Let your screws and taps be assorted so no time is lost, and if a countersink for a screw head is needed, no picking over three or four to get the one needed; have them arranged so you can put your hand on them at the first effort. This is true all through a workshop; three out of four workmen waste ten per cent. of their time looking for tools. The arrangement and care of tools is a big thing in a jeweler's shop. I don't mean by this an over nicety for show, but to have every tool in a condition to be serviceable, and where they can be picked up just when wanted. It is not well to use the same tools you use for spec work for watch work, especially screw drivers; for in spec screws you will have to use a screw driver entirely too rough. For spec screws a plate made of steel $\frac{1}{8}$ by $\frac{3}{16}$ is large enough. I gave the larger size for general use.

The Stopwork.

[BY M. GROSSMAN.]

Continued from page 391.



TWO STEADY pins, well adjusted, are quite sufficient, and much better than three pins made in the common careless way, with which a cock often goes on rather hard at the beginning and allows some shake when close down to the plate. The steady pins should not be too long, for if they are they bend too easily. The length must not exceed double their thickness and the pin wire must be drawn as hard as possible. To be effective they must stand as far apart as the foot of the cock will permit.

The balance is a part the dimensions of which show very great variety in watches, and without undertaking here any dissertation on this subject, I will restrict myself to stating that I believe it a good

proportion to multiply the diameter of the pillar plate with 0.4, or to take four-tenths of it as the diameter of the balance. With a movement of 16 size, or 44 millimeters, this would be $44 \times 0.4 = 17.6$ mm.

If the movement is to have a compensation balance, great care must be taken to have ample space for the inside and outside of the rim. I have noticed many cases of inexperienced workmen being nearly driven to despair by a watch apparently in a most satisfactory state and performing quite well, but at the beginning of the cold season they stopped regularly every night. When being examined, of course, in a warm room, the watch resumed its ordinary march without showing the slightest disorder, till it was found out that the expansion of the balance brought it into contact with a cock or other part too near its circumference.

THE CASING.

The method of casing presents a variety of features and necessarily varies according to the style of case; therefore, in order to settle this point we must first decide on the best plan of case.

There is, first, the old English style of case with a fixed dome, the hands to be set and movement to be opened from the dial side. In this case the movement is fixed at the twelve with a joint and held in its place at the six by a catch, which for opening can be pushed in with the nail of the thumb. This method makes, undoubtedly, a good strong case, but it has many inconveniences for the wearer of the watch. For winding, the case must be opened behind, and for setting the hands it requires to be opened on the dial side. A very bad feature of this arrangement is the opening of the movement by means of the catch—a slipping off from it of the thumb nail has caused the ruin of many a good seconds or minute hand. A case of this kind may be employed for a full plate movement in which, by its nature, the hands must be set on the dial side, but any three-quarter plate or bridge frame ought to have the setting square behind.

For this latter kind of watches the modern form of case will be the most convenient. The movement is fixed to the case by one steady pin and one or two screws, the latter being best. The Swiss watches generally have three pins driven into the edge of the pillar plate at some distance from each other. The middle one of those is the strongest and of a square shape, and partly enters into a small recess in the rim of the case, thereby preventing any circular displacement of the movement, and the outer end of it, filed sufficiently down from its upper side, takes hold under the rim as well as the two side pins. This mode of fixing the movement generally with only one screw is rather troublesome in putting in and taking out the movement, especially with the very thin cases of so many Swiss watches.

Therefore I propose another plan, which, if the pillar plate and its shoulder be properly fitted into the rim of the case will answer completely, though of very simple and easy execution. A hole must be drilled through the upright part of the rim surrounding the pillar plate into this plate. A pin driven into the hole in the plate, and shortened so as to enter into the rim without exceeding its outer side, serves at one and the same time to hold the movement down in its place, and to prevent any side displacement, two common key screws, each 120° , or one-third of the circumference apart from the pin and from the outer screw, and taking their hold on two studs soldered to the inside of the rim, complete the fastening. The pin ought to be always placed near the balance, so that this most delicate and precious part of the movement comes first into its position in the case, and is not exposed to any violence when forcing the movement down on its seat. It is very essential to adjust a movement carefully into the case, so that it enters quite smoothly and without any pressure, because in this latter case, especially if the case is strong and the plate thin and not hard, it might easily suffer a deflection in a sufficient degree to alter the end shake of the pinions.

I would not recommend to have the key screws for the casing in the upper plate, and taking their hold on the outside of the rim of

the case, because the plate is too thin to offer sufficient stock to the screw, and because this thin plate, if the screws are strongly turned in, is liable to bend. The pillars must then be considered as a fulcrum, and in the ratio as the screws tend to lift the outer edge of the plate the inner parts will bend down and thus diminish the end shake of the pinion.

The movement in the modern case is accessible from behind by opening the dome, and, as the hands are set from this side, the wearer of the watch has no occasion whatever to open the dial side of the case. In this kind of case the dial ought to be fixed with key screws and not with pins, else it would not be possible to take it off without previously taking the movement out of the case.

I often see Swiss watches of recent make having the heads of the casing key screws below the dial. This arrangement has no comprehensible advantage, but subjects the repairer to the vexation of being obliged to take hands and dial off before he can remove the movement from its case.

The setting square ought to be provided with a cap, as well as the winding square, in order to prevent any particles adhering to the key from entering into the movement. Care must be taken to have these caps reach up to the inner side of the dome and without any excess, because this would, especially in a strong case, produce a pressure on the plate when the case is shut, and which would often be sufficient to stop the watch by reduction of the necessary end shake of the pivots.

The cases in which the movement can be opened with a joint offer a greater convenience for the exact timing of the watch, because the timing screws of the balance are more accessible; but this convenience is of no great consequence.

It remains to say a word about the contrivances having for their object the protection of the movement, or of certain parts of it, from the dust penetrating through the case. The watch, because it covers the whole movement, without the slightest exception. In the majority of cases it is admirably made and effects its purposes well. It has been tried with similar success to protect the movement of three-quarter plate watches, though the dust cap, by the additional height of case it requires, does not harmonize with the modern watch. It was an absolute necessity to employ it with the old cases, opening and shutting with springs, and consequently far from being dust-proof. But with the gradual progress of case making, the cases shut tighter now than they used to do, and therefore the dust caps can be entirely dispensed with. The fitting of the cases, if they are made with a little care, shut very closely, and nevertheless open and shut with ease. For this purpose the rims must not be too much undercut. The best class of English cases are generally fitted with much care and judgment. The rim ought to be slightly rounded for the smooth passage of the shutting edge of the rim over its highest point.

The dust covers in ring shape, surrounding the frame of full plate movements, avoid the disadvantage of occupying more height in the case, but they are also so much less efficient. What is the use of protecting the train from dust if, at the same time, the balance, the balance spring and the counter sinks in the upper plate, with the oil in them, are exposed?

THE JEWELING.

The jewelings is an improvement in horology belonging to its newest period. It is evidently a great progress to introduce a material indestructible by friction, not susceptible to chemical influences and capable of the highest polish for the bearings of the pivots, thereby insuring the stability of their action, the preservation of the oil and the reduction of frictional resistance to a minimum. Jewel holes ought to be well examined before using them, because if the hole is not carefully polished or if its edges are rugged, they are worse than metal holes, for they wear the pivot very quickly.

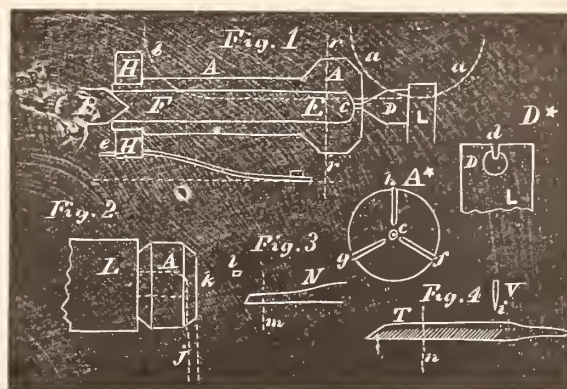
(To be Continued.)

Lathes and Lathe Work.

BY THE MODEL WATCHMAKER.



THE POINT to be observed in splitting a chuck is to leave an uncut portion of the chuck at each end after the circular saw has completed its work. At fig. 1 is shown a chuck in longitudinal section, and the centers attached to the two L-shaped pieces described in November number. In splitting the chuck *A*, as mentioned above, we leave a small ring of metal around the small hole drilled in the end of the chuck which receives the center *D*. This small ring is shown at *c*, diagram *A**, which is an end view seen in the direction of the center *D*. The saw which does the splitting is shown at *a*, when, by the slide device given in November number, the chuck is made to advance to the dotted outline *b*. For chucks in which the hole at *c* is very small the saw *a* would have to approach quite near the center; when this is the case the center *D* is grooved to let the saw *a* pass as shown at diagram *D**, where *D* shows the supporting center and *L* (the L-shaped piece alluded to in last article). It is as well to make the groove *d* at the commencement, then we can be ready for chucks of any size of grasp. For dividing the chuck into 3 equal spaces to be cut by the saw *a*, we screw on the end of the chuck, where the drawing in spindle takes hold, a small wheel or button *H*, in which are 3 notches cut, which engages the wide flat spring *I*. The spring *I*, where it holds *H*, is made



narrower at *e*, where it falls into *H*. Very accurate spacing need not be insisted upon; still, it is important that the three parts which form the chuck should be of equal strength, or the jaws will close unequally and consequently untrue. Now, let us take a *resumé* and consider if our labors so far have been conducted in such a manner as to ensure the best results. We first drilled our hole *E*, and then to ensure our center at *D* being exactly axial, we made a special pointed tool which centered the hole *E* perfectly, and then drilled the small hole *c* (diagram *A**) from the inside; we next turned up the chuck *A* on centers at each end corresponding to the axis of the hole or tube *E*. We have now (we suppose) split *A*, except the slight ring at *c*, diagram *A**, and our chuck *A* is ready to be put in our lathe and held in place by the drawing in spindle. I should speak of the guide slot in the chuck which slips on a screw or pin on the inside of the lathe arbor, to ensure the chuck being always inserted in the lathe spindle in exactly the same position. To make this slot we change the saw *a* for a thicker one, and reverse ends of the chuck *A* in the centers *B D*, and use one of the 3 slots (say *f* in diagram *A**) to engage *e* of the spring *I*. Of course, we have removed *H*. If, now, we insert the chuck *A* in our lathe arbor and draw it firmly into place, our chuck is all right except the ultimate boring out of *c*, and turning and finishing the front or projecting end of our chuck. The position is shown in fig. 2, where *A* represents our new chuck and *L* the lathe arbor. In all our split chucks the hole or tube *E* is supposed to be of the same size, and the size which the chuck will grasp depending on the size of the hole *c*. This is only in a broad sense, for we should vary the depth to which the incisions *f g h*, diagram *A**, are cut proportionate to the size

we wish to grasp. This idea being kept in mind, we set our chuck so the saw *a* will cut inward to $\frac{1}{10}$ of an inch of the size we intend ultimately to enlarge the hole *c* to. The two dotted lines at *j* are supposed to represent the extent of the cylindrical or grasping part of the chuck. Among expert lathe builders this is a mooted question, but the writer favors about a diameter, that is, if the chuck is intended to grasp a piece of wire $\frac{1}{10}$ of an inch in diameter, the cylindrical grasp should extend in the direction of the axis of the lathe $\frac{1}{10}$ of an inch. Or, if to grasp $\frac{1}{8}$ of an inch, let the cylindrical grasp be $\frac{1}{8}$. The system we have adopted enables us to attain this end almost perfectly. By putting a sharpened pegwood into the hole *E* and forcing it in *c*, and turning it as if pegging out a pivot hole, we can, by cutting off with a knife all that protrudes, get at the thickness of the end of *A*, and turn off the outer end at *k* to very near the right thing. We could, by simply broaching out the hole *c* to the desired size, get a chuck which would be very near true. But the better way is to turn out the hole *c* to the size we desire. Some workmen insist on turning out *c* with a fixed tool in a slide rest, but the writer doubts if, all things considered, any course is better than to use a hand tool small enough to effect the object, and shaped as shown at *N*, fig. 3, *l* being a transverse section on the line *m*. It requires some practice, but one will soon learn to turn out a hole with extreme accuracy. After the hole *c* is bored out we should make a file or saw of a piece of steel the same thickness as the saw *a*, fig. 1, shaped as shown at *T*, fig. 1, a magnified transverse section being shown at *V*. The edge *i* will sever the thin ring of metal left around *c*, and our chuck is ready to be used for any purpose for which it is adapted. The writer spoke early in the description of how to make split chucks, of his convictions of the superiority of soft chucks over hardened ones. He will now explain why. If a hardened chuck gets out of true it must be softened before it can be turned up and then re-hardened, and in these manipulations the chuck is liable to being in the end no better than it was before. In a soft chuck, if it gets out of true, attach it to the drawing in spindle (taking the drawing in spindle from the lathe) and heat the chuck until it will melt the ordinary black lathe cement, and fill the splits only at the outer end. Scrape off all superfluous wax, leaving the wax in the saw kerf. We have now one split chuck as rigid as the uncut one we were just describing. We put it in the lathe and bore out the hole *c* so it is perfectly true, only a little larger; if, now, we have just made a new chuck with the hole *c* of the same size as the one enlarged, we have our set of chucks complete. The idea is, every time we bore out and true a chuck we enlarge it, but should have a new one in its place. In hardening we harden only the grasp where it clasps the thing to be turned, or up to the dotted line *r*, fig. 1. The chuck should be hardened before the ring at *c* is cut *i. e.*, if we intend to use it as a hardened chuck; but in the case of a soft chuck we bore it out and then cut it with the device shown in fig. 4, which is a slip of steel of the same thickness as the saw *a* and shaped as shown at *T*; a cross section of the tool is shown at *V* on the line *n*. The device is about 2 inches long and shaped as shown; the lower edge is cut on each side into a sort of a file with a graver. In the case of a hardened chuck the tool *T* is not used; after the chuck is hardened lay the end of the chuck about where the dotted line *r* indicates, on an anvil or stake, and strike the chuck with a hammer and the slits at *f g h* will readily break apart.

Mrs. Stanford's Fine Jewels.



THEY are now calling the houses on the north side of Farragut Square "Millionaires' Row," because one of the three is to be the winter residence of Senator Stanford, of California, and the next one that of Congressman Scott, of Erie, and the third is occupied by the official representative of "all the Russias," who is also believed to be rich in his own right. Senator and Mrs. Stanford

will not take possession of their house until the second week in December. Few, even among the royal families of Europe, have more valuable diamonds than Mrs. Stanford. One who can speak authoritatively says her diamonds are valued at \$1,000,000. Her husband bought four sets of diamonds for her when the valuables of Queen Isabella, of Spain, were sold in Paris and paid upward of \$600,000 for the four. One set is of the stones known as "blue diamonds," as they emit violet rays by day; another has pink rays in its stones; the third set is of yellow diamonds, as yellow as topaz, and the fourth is of flawless white stones. Each set has a tiara or necklace, pendant, brooch, ear rings, from four to six bracelets and some finger rings, all of the same style of make and of corresponding stones. In addition to these Mrs. Stanford has some genuine black diamonds, cut pear shaped, and numerous other diamond ornaments in a variety of styles. One necklace (not belonging to any of the sets above named) is valued at \$100,000 and its pendant at \$30,000. She has over sixty diamond finger rings, which she keeps on a string of black tape. To accommodate all these jewels she has a case which was made to order of steel, with cast-iron handles and burglar-proof locks. The case has a separate drawer for each set of diamonds, and is, of course, nearly all the time deposited in a bank. Mrs. Stanford cares very little about these treasures, especially since the death of her only son, whom she idolized. On one occasion, before his death, she wore nearly all her jewels at once. It was when a dinner was given herself and husband by Mr. William E. Dodge, of New York. She wore a black tulle dress, embroidered in silver, and its draperies were clasped with ornaments made of her smaller diamonds which she had reset especially for that occasion. She also wore tiara, necklace, pendant, ear rings, brooch and other ornaments of diamonds.—*Washington Letter to the Philadelphia Times.*

Recent Patents.

The following list of patents relating to the jewelry interests, granted by the U. S. Patent Office during the past month, is specially reported to THE JEWELERS' CIRCULAR by FRANKLIN H. HOUGH, Solicitor of American and Foreign Patents, 925 F Street, N. W., rear U. S. Patent Office, Washington, D. C. Copies of patents furnished for 25 cents each.

Issue of November 16, 1886.

352,715—Clock Movement Frame. S. P. Sandmark, Ishpeming, Mich.

352,819—Watch Balance. G. E. Hart, Assignor to Waterbury Watch Co., Waterbury, Conn.

Issue of November 23, 1886.

352,917—Bracelet. T. Granberry, New York, N. Y.

352,935—Watch. C. G. Schellenberger, St. Paul, Minn.

Issue of November 30, 1886.

353,401—Breastpin Catch. S. E. Cheeseman, Snow Shoe, Pa.

353,482—Jewelry, Article of. J. C. Cottle, New York, N. Y.

353,418—Watch Balances and Hair Springs, Device for Testing. A. L. Keller, Springfield, Mass.

Issue of December 7, 1886.

353,778—Button or Stud. L. P. Conrad, Red Lion Square, Middlesex County, England.

355,706—Watch Case. D. O'Harra, Waltham, Mass.

353,961—Watch Case. D. O'Hara, Waltham, Mass.

353,933—Watch Case Center. W. D. Fitzgerald, Brooklyn, N. Y.

353,930—Watch Case Centers, Manufacture of. W. H. Fitzgerald, Brooklyn, N. Y.

353,932—Watch Cases, Manufacture of. W. H. Fitzgerald, Brooklyn, N. Y.

- 353,929—Watch Cases, Manufacture of Crowns for. W. H. Fitzgerald, Brooklyn, N. Y.
- 353,931—Watch Cases, Manufacture of. W. H. Fitzgerald, Brooklyn, N. Y.
- 353 687—Watch, Stem Winding. A. L. Keller, Elgin, Ill.
- 354,002—Watch, Stem Winding. C. V. Woerd, Waltham, Mass.
- 353,795—Watch, Stop. H. A. Lugin, New York.
- 353,749—Watches, Pendant Stem for. A. L. Keller, Elgin, Ill.

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The regular monthly meeting of the Executive Committee was held on the 10th inst., attended by Vice-President Hayes, J. B. Bowden, Chairman, and Messrs. C. G. Alford, N. H. White and Secretary Champenois.

The following applicants were accepted as members, viz.:

- A. W. Austin, Norwalk, Conn.;
- C. S. Cutting, Joliet, Ill.;
- Louis C. Eisenschmidt, Newport, Ky.;
- A. B. Griswold & Co., New Orleans, La.;
- Emil Geist, St. Paul, Minn.;
- J. D. Howell, Livonia Station, N. Y.;
- Strobell & Crane, Newark, N. J.;
- Wm. J. Stein, Stillwater, Minn.

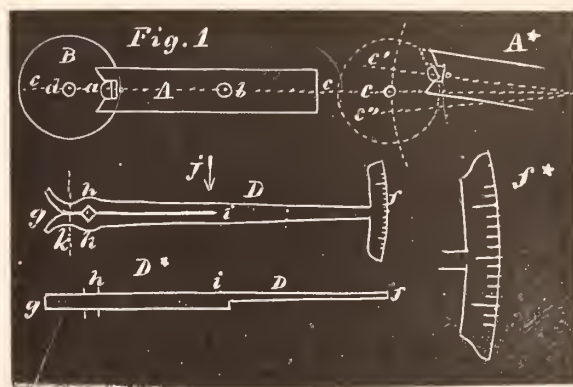
Problems in the Detached Lever Escapement.

BY DETENT.



TO PROPERLY understand the conditions and factors involved in the problem under consideration at the close of last article, we will have recourse to fig. 1 shown in the present issue. Here is shown a pallet and fork at a state of rest, *i. e.*, the jewel pin rests in the fork; and a straight line *c* will pass directly through the center of the pallet staff *b*, the jewel pin *a*, and the pallet staff *d*. If now power is applied, or, in other words, the watch is wound, the fork is carried by the impulse 5° to one side, and assumes the position shown in diagram *A**. Here the jewel pin *a* is shown as still resting on the lip of the fork which conveyed the impulse; the jewel pin is free to pass out of the fork in its arc of vibration; but what will be the result if we advance the fork to the dotted outline shown at *c*? In this condition the jewel pin could not escape until we opened the banking pins and increased the arc of lever action of 10° shown between *c'* and *c''*. Here we have illustrated precisely the conditions that would exist if some unskillful workman should take a fancy to advance the fork on the pallet staff. In this state of things we would have an excess of both roller and fork action. The problem in hand is to determine the best course to pursue to set the escapement right. Experience and judgment are great aids in such corrections, still we desire something more definite than mere intuition. If 10° pallet and fork action is what is

needed, we should seek to establish this action, and then bring the other parts to conform. And the question now in hand is how to do this. If in every instance the pallet stones were exact duplicates of each other, and the teeth of the scape wheels precisely alike, then all we need do would be to set our pallets so we would have the proper amount of lock on each pallet, and yet have the teeth escape all right, and we should have our 10° pallet and fork action. But, if we will take the trouble to go over 3 or 4 dozen pallet stones with a pair of micrometer callipers, and note the difference in thickness, and also observe the difference in angle, not only between the entrance and exit pallets, but in the angles for each kind of stone, we would see how uncertain this course would be. This inequality is in a great measure to correct teeth imperfections, or differences perhaps, would be a better term, because two scape wheels may be equally well cut and correct, and one wheel requires thicker pallet stone than the other. The proper manner of considering the relation of teeth to pallets, and pallets to teeth, and how to compensate for a peculiarity of one by a modification in the other, will be the subject for an article very soon. When speaking of the club tooth escapement early in this series of papers the writer commented briefly on the fact that the impulse could be equally divided between the tooth and the pallet, or the relative proportion could be changed and the advantage given to either. But to fully describe *how* to accomplish these changes was left for a subsequent chapter. Some ten or twelve years ago the British Horological Society offered a prize for a cheap, simple and reliable instrument which would test and meas-



ure the angle of escapement. This reward called the importance of the want of something of this kind to the writer's attention, and he hit on the little device we will proceed to describe. The writer made a rude one which answered the purpose perfectly in all full plate watches, and has promised to modify it so as to be available to $\frac{3}{4}$ plate movements, but it has been put off, from time to time, in a manner I presume most of my readers will appreciate. Still, if applied to only full plate watches, it is of first-class importance, and it also has a tendency to establish a sense of correctness which is a great help in dealing with $\frac{3}{4}$ plate watches. The device is shown at fig. 2, magnified 3 times. It is made of a piece of sheet steel, about $\frac{5}{8}$ of an inch long, and $\frac{1}{32}$ thick, and shaped as shown. The details are as follows: The bar *D* made of steel $\frac{1}{32}$ thick, is slotted as shown at *g i*. This slot divides the bar *D* into two jaws *h h* and at *n* is shown an angular notch in each jaw *h*. These notches are to grasp the pallet staff below the pallets with sufficient force to hold the bar *D* steadily in place. The turned out terminations of the jaws *h h* shaped as shown at *g*, are to allow the device to be slipped on the pallet staff without taking the watch apart. The idea of the thing is to provide an index, the center of which will correspond to the centre of the pallet staff, which will show us exactly the angular motion of the fork and pallets. The little index *f f* is curved on a circle whose center is at *n*; this index should be made as light and thin as possible, indeed the whole device should contain as little material as is consistent with strength and durability. The bar *D* should be spring tempered so the jaws will close the notches at *n* with sufficient force to securely move the index *f* back and forth with the lever at each impulse. The scale or index *f* is divided into

10°, and a degree or two added on each side to show the exact arc of vibration. At diagram f^* is shown the index enlarged about 5 times to show the manner of dividing it. It will be well to describe the manner of making the bar D and index f . We take a piece of steel, about the $\frac{1}{8}$ of an inch thick, $\frac{1}{8}$ wide and $\frac{5}{8}$ long. A charcoal annealing box is the best for softening steel, but if we heat the steel to red heat between two pieces of charcoal with a blow pipe, and allow it to cool in that position, it will be soft enough to work well. After the roughed out bar D is properly annealed we saw with a jeweler's saw from g to i . We next lay D edgewise on an anvil or stake, and strike it with a hammer at the point indicated at the arrow j until we close the saw kerf together. If we did not take this course the pieces $h h$ would hardly clamp a pallet staff securely. After the jaws $h h$ have been once closed at i we can pry them apart at g enough to allow us to dress up the notches at n with a very small square file. On making these notches we must be careful not to make them too deep to clasp the smallest pallet staff. After D is fitted into perfect shape it should be hardened and tempered. Before heating we should wrap a piece of fine bending wire around the jaws $h h$ at the dotted line k —this is to bring the jaws firmly together. In the one the writer has the index f is separate from D , but if he was to make another he would have the index f and bar D of one piece, as the index f to be in proportion would only be about $\frac{3}{8}$ of an inch long. If the length of D from n to f was $\frac{1}{2}$ an inch the index f and bar D up to near the slot at i can be filed down to half the thickness on the lower side as shown at diagram D^* . If the reader will make the device $\frac{1}{2}$ the size of the cut and shaped about as shown, he will find it all right. In the next article I will tell how to divide the index f , and also how to measure the impulse and lock, and determine to $\frac{1}{2}$ a degree the fork and pallet action. Nothing can be simpler than to test the perfection of an escapement by this instrument. We slip the jaws $h h$ on the pallet staff, lay the movement dial down on an old movement box, and the index f will show the lock and impulse of each pallet.

On Repairing and Examining Watches.

[By CLAUDIUS SAUNIER.]

Continued from Page 395.

CASE, GLASS, DIAL, CAP, DOME.—In addition to the parts specified in the beginning of this article, the following require attention: See that the position of dial is not altered by closing down the bezel, that the fusee dust cap does not touch the dome or cap, and that the diamond end stone or other jewel of the balance cock is free of the case. In three quarter plate watches the chain is occasionally found to rub against the edge of the case, or the top plate to press against the bottom edge of the same, causing the train to bind. See that the balance and chain and the fusee great wheel are free of the cap, where one exists, the chain is especially liable to rub after the breaking of a strong spring, which may cause the barrel to bulge, when it may also rub against the potence. Ascertain that none of the dial feet or pins touch the train, that the hour wheel is clear of the third and fourth wheel bar, and the minute hand out of contact with the dial plate, and not pressed by the dial. See that the third wheel is free in its hollow, and that the balance, more especially in over-sprung watches, is clear of the barrel.

MOVEMENT.—The regulator or index must be tested, especially in watches that are under-sprung, at several points between "fast" and "slow," to see that it nowhere approaches too near to the spring, is held with sufficient firmness, and that it never comes near enough to the guard pin for contact to occur. See that the potence screw and steady pins do not project, and that the barrel does not touch the name plate, balance cock, top plate hollowing or great wheel.

Before taking off the top plate, notice the position of the detent in the steel wheel, and the amount of its end shake; the wear of the

holes, and freedom of the train wheels; the position of the third pinion with respect to the center wheel, and that of the escape wheel to the lever; see that the banking pins are not loose or bent; that the guard pin, which protects the balance staff when the chain breaks, is near enough to the barrel and the potence. When the watch is taken down, any loose pillars or joists must be secured, pivots examined to see whether worn or bent, and those working on end stones that they cone through the holes. The fourth wheel pinion must be free in the hollow of the pillar plate, and the center wheel in its hollow; a similar examination also must be made of the collet and pin which secure the great wheel to the fusee. If a chain is broken near the barrel end, the stop work is probably defective or the spring too strong.

The following faults may be met with in the English stopwork: The stop may come opposite the fusee snail too soon or too late, allowing one turn too few or too many of the fusee; or the back of the snail may butt against the stop, and thus stop the watch after going a few hours. Overwinding sometimes occurs in consequence of the stop spring being locked between the shoulder of the stop and its brass stud; and the blade of the snail or the end of the stop may be worn or bent in cleaning.

In three-quarter fusee watches see that the balance does not come too near to the fusee, fourth wheel, center wheel, and sometimes the escape wheel. It is to be observed that the breaking of a mainspring sometimes causes certain teeth of the great wheel to be strained.

ESCAPEMENT.—Very full details in regard to the method of examining a lever escapement, as well as of the causes of stoppage and variations in connection with it, will be found at page 463-470 of the "Treatise on Modern Horology." It may be well to note the following few particulars that should always be attended to: See that ruby pin and pallet stone are firmly set, that neither pallets nor roller is loose on its staff, and that the lever and pallets are rigidly fixed together. The guard pin must be firm, the balance well riveted to its collet, the spring collet sufficiently tight, and the curb pins firm. If there is a compensation balance, ascertain that each screw is tight. The precautions to be observed in regard to the balance spring were given in the chapter on "the action of the escapement."

STEM WINDING ARRANGEMENT.—So great a variety of arrangement of the mechanism for winding watches at the pendant is met with at the present day that it would be impossible to give detailed directions in regard to their examination; the following remarks, however, mainly taken from the work of M. A. Philippe, "Les montres sans clefs," will be found of value in directing attention to the points which most require it, and will suffice for any intelligent workman: It should be observed at the outset that the adjustment of stem winding work is almost entirely a question of depth, and the workman who has thoroughly mastered this subject, as explained in the "Treatise on Modern Horology" (as well as in an article that appeared in THE JEWELERS' CIRCULAR for October, 1886,) will rarely experience any difficulty in dealing with stem winding mechanism.

Carefully observe each depth, etc., in succession, to make sure that no prejudicial friction occurs either between teeth or by contiguous parts coming in contact. All springs should act solely in the direction in which pressure is required of them. Special attention should be given to the intermediate steel wheel for communicating motion to the canon pinion, when this exists, as it is permanently in gear with the train, so that any unevenness in depth will affect the rate; if the minute wheel have too much play or end shake on its stud, it is apt to ride on the intermediate steel wheel. The friction of the cannon pinion on the set hands arbor must not be excessive, since it would involve too great a strain on the teeth of the minute wheel, nor too slight, since the hands would be liable to be displaced on releasing the set hand stud. If the intermediate wheel has too much end shake, limit this by an eccentric screw overlapping its edge.

Test the spring of the set hands stud, to see that it is not too

strong or too weak and that it moves parallel with the plate. Failure in this latter particular might lead to its rising on the rocking bar or other piece on which it acts. The winding pinion depth must be examined to see that it is neither too deep nor shallow. A method of correcting such a fault was given in the October number of THE JEWELERS' CIRCULAR.

The set hands steel spring must be strong enough to resist any accidental pressure on the stud, but, on the other hand, the strength must not be excessive, as the spring will then be all the more liable to break, besides causing inconvenience when setting the hands. The course of the spring should be banked at the point, which gives a good depth between the winding and intermediate wheels. The minute wheel stud must be firm in the plate, as any accidental binding might otherwise unscrew it, occasioning the breakage of the dial. When the minute hand is carried by the set hands arbor, and not by the canon pinion, care is necessary in fitting this latter, for, if too loose, it will rotate in setting the hands without carrying the minute hand round, and the minute and hour hand will cease to agree.

It is important that attention be paid to the application of oil to stem winding work, as, in its absence, rust rapidly forms, and the mechanism becomes bound. Of course, all bearing surfaces, such as the interior of the pendant, intermediate and minute wheel studs, studs or screws of the rocking bar, or other surfaces on which wheels rotate, must be lubricated; an equally important point is to liberally oil the teeth of the winding pinion and the bevel or crown wheel that engages with it. The application of a little oil inside and outside the canon pinion must not be forgotten.

[THE END.]

Fashions in Jewelry.

A Lady's Rambles Among the Jewelers.

A FEATURE of the month just past was a demand, larger than before for several holiday seasons, for finer grades of goods in all directions. Manufacturers, importers and retail dealers who have been interviewed on the subject, all claim that the demand for richer goods was a very strong one, and this, in addition to the increased number of sales, has produced a better feeling among the trade than has existed before in a long time. This splendid holiday trade, it is plain to see, will have the effect of largely increasing the production of higher priced goods for the spring trade, and articles that sold well during the past month will, in many cases, be reproduced. Hence, a brief glance at some of these will hardly be amiss.

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THE Queen chain, during the holiday season, proved one of the best selling articles in the jewelers' stock, and was out in a bewildering variety of patterns. One of the most beautiful Queen chains seen, terminated in a large half ball of gold, the flat face of which was set with a Spanish topaz. This topaz showed a female head cut in intaglio. The convex surface of the ball was decorated with grain ornamentation, a style of finish, by the by, that is likely to take well in the finer grades of jewelry. Very beautiful, too, were Queen chains in green and other colored golds.

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THE new watch chain for ladies, announced last month, has been christened the "Empress," a name likely to become as popular and

widely known as the Queen. It is quite short, with a swivel for the watch at one end and a small but decorative pin at the other, which is fastened to one side of the corsage, the watch being worn inside the dress bodice after the same fashion as the Queen. From the pin hangs a chain of equal length with the main one, to which is attached a ball or other charm. In addition to its attractive appearance, it is claimed that this chain will be found an exceedingly convenient one, as the pin attachment prevents the watch from pulling on the chain. The "Empress" is susceptible of being made in many styles, and will doubtless be out for the spring trade in a great variety of patterns and finish. The pin and pendant charm afford a wide scope for the ingenuity of the designer and the taste of the decorator. As this chain is sent out by a first-class house and represents excellent workmanship and finish, there is little doubt of its success. Women who are on the alert for something new, and their number is a large one, will welcome it as a pleasing change from the popular Queen.

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A PRETTY trifle that proved popular with holiday shoppers on silver Queen chains, was Kismet amulets in medallion form and set in a silver rim. These amulets emitted a delicate fragrance that defied competition with the best of Lubin's extracts. Other pretty charms for the watch chain consisted of moonstone faces set in the center of vinaigrettes of gold in the picked nugget finish. In onyx, a new style of Queen chain seen showed oval faceted links. A pendant, new at the holiday season and likely to figure in the spring trade, is a modification of the knot pattern that shows interlinking rings, some of which are finished with picked nugget while others are heavily chased. While there are all sorts of pretty pendants for Queen charms in fancy shapes, such as vinaigrettes, flowers, knots and the like, very large and richly chased balls and cubes are probably the most popular. Such fancies, however, as a clover leaf imprisoned between two disks of crystal and set in a slender frame of gold or silver, find patrons, as do tiny whistles and novelty pencils.

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THE ball pattern, especially in larger sizes, is a popular one with French ladies for hair pins, and there is good reason for believing that these large ball hair pins will figure conspicuously in the finer goods for the spring trade. Some of these balls will be cut in facets, others will be heavily chased, while others, again, will show the grain finish or the vermicelli decoration. These decorative hair pins, which have been so popular during the past year in New York City, appear to have gained widespread favor, and consequently will remain fashionable for some time to come. For evening wear there is quite a demand for jeweled hair pins. A very pretty style represents a gold butterfly, the open work wings of which are studded with diamonds or other stones. Jeweled combs, in miniature sizes, are also used on hair pins, as are flower patterns set with gems.

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THE most popular article to-day in jewelry is the neck pin, by which is meant all classes of pins, including brooch, intermediate and bar pin, scarf pins for both sexes, and ribbon pins. The holiday sale in these various pins was an enormous one, and manufacturers are making ready a big supply for the coming season. In exclusive fine goods the brooch, or shorter pin, by which latter is meant a combination of brooch and bar pin, takes the lead, though the bar pin continues a good selling article. The tendency is, however, in the newer bar pins, to shorten the length and break the bar effect with a

medallion or other design in the center of the pin. The little ribbon or velvet pins, which differ from the scarf pin in that they fasten with a short pin and catch, continue to keep their hold on the public, and are worn on both bonnet ties and neck ribbons.

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OF THE making of scarf pins there appears no end. The increased demand for studs does not appear to affect their position in the least. This is due in part to the fact that women, as well as men, affect the scarf pin. It can not be said that any one style or pattern prevails in these pins, though there is, at the present time, quite a fancy for enameled pins representing birds of bright plumage. Flowers and insects have, however, lost none of their old popularity as models for these pins. For the popular trade, one sees in this ornament all imaginable combinations, such as toboggan pins, a small gold skate, an umbrella or a miniature sled. Strangely enough, many old time patterns prevail, such as the crescent, the star, the horseshoe, the gold or moonstone ball in a gold claw and the knot pattern in one of its many forms.

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THE late craze in the floral world for chrysanthemums has not been without its effect in jewelry, the chrysanthemum having appeared as a model in some of the holiday goods. New jewelry out for the spring trade is also copying this beautiful flower. One of the prettiest examples seen of chrysanthemum jewelry was a brooch simulating this flower in form and showing its shades in variegated golds, a brilliant in the center acting as a dew-drop. The chrysanthemum also makes an attractive pendant in variegated gold and gems, and is employed with pleasing effect in ear rings.

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A NOVELTY in flower pins consists of a single flower which may be a daisy, chrysanthemum, rose or other blossom, with a long gold stem, very slender, and expressing in its curves the flexibility of the stems found in nature. Equally attractive with these are the pins that represent a bunch of flowers with their long flexible stems. Many of these are enameled in natural colors; others are set with pearls or diamonds; while others, again, show one of the several popular finishes in plain gold.

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EAR rings are coming on apace, many assertions to the contrary notwithstanding. Our foremost manufacturers are making them in a variety of patterns for the spring trade, being pretty well assured in their own minds that there will be a demand to warrant their production. There is a tendency in the finest goods to make ear rings larger than heretofore. The ball is one of the favorite forms, as it admits of so many styles of decoration, and is attractive whether set with gems or not. Flower patterns also hold good, as do modifications of the knot pattern. There is no question but that ear rings are being more and more made to match or harmonize with the brooch. Charming examples of this fancy are the miniature paintings on ivory encircled by brilliants or pearls, or set in a unique silver framework. These paintings on ivory, which have appeared for the first time in silver jewelry, were quite a feature of the holiday trade. They were set as brooches, ear rings and sleeve buttons. Much of the frame work was in antique pattern and niello finish,

Quite a novelty were the miniature paintings on ivory set as brooches in circles of white topazes.

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CHASING continues a favorite finish in gold jewelry, though many other styles are fashionable. What is termed the picked nugget is very effective. The vermicelli, as the decoration consisting of fine gold wire, laid on, is termed, continues in favor; so does the Roman and polished styles of finish. The grain ornamentation, which consists of artistic designs formed by little bead-like lines, is both new and attractive, affording one of the most elegant styles of ornamentation seen in a long time.

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A NEW brooch likely to attract attention from the better class of patrons, is concave in form with a diamond in the center, and the grain decoration, already described, covering the surface. Associated with this brooch are ear rings to match; and this leads to the fact that brooches and ear rings are being more and more made to serve as sets, though it can not yet be said that sets have regained their old time popularity.

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FINE Limoge enamels are to be seen now for the fine trade, in form of brooches, cuff buttons and pendants, both in gold and silver settings. There is also an attractive assortment of bar and oval-shaped silver pins in fine chased finish, on which appear, in colored enamels, birds, insects and other designs. A very attractive brooch is one in the form of a *fleur-de-lis*, with gold trimmings.

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SILVER jewelry has attained the point where it is safe to claim it as a staple article as much in fashion as is gold jewelry. It shows, not only in form, but in finish, as many varieties as are produced in gold, though silver jewelry in antique pattern, of niello finish, is a favorite sort. Jewelry which employs old gold coins, large and thin with age, is worn sometimes as a neck pin, sometimes as a scarf pin and sometimes as a pendant to neck or watch chains. The same may be said of old silver coins.

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MANUFACTURERS and retail dealers agree that necklaces of delicate construction, both in gold and silver, will be, during the coming season, as in the present, fashionable. Necklaces composed of plain gold beads are popular, not only here in the East, but on the road, affording, as they do, a becoming ornament at a moderate cost, and furnishing, furthermore, a convenient object from which to suspend a handsome pendant. A necklace much affected by young ladies, is a flexible one made of links to simulate small flowers, such as forget-me-nots or daisies. These are sometimes finished in colored enamels. A form of necklace that has found favor with some is composed of gold wire interwoven into a flexible band that fits snugly to the neck, and is nearly or quite an inch in breadth. It goes without saying that pendants, especially those which furnish a setting for fine gems, are in as high favor as ever. Favorite forms for pendants are the *fleur-de-lis*, the crescent, star, a single flower and the wheel pattern.

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BRACELETS, especially flexible ones, and bangles with pendants,

continue fashionable. Numbered with newer fancies in this direction is the link bracelet, with graceful ball guard attachments. This attachment consists of a decorative ball of gold depending by a daintily made chain from the bracelet. This acts at one and the same time as an ornament to the bracelet and a guard against its loss through an insecure clasp. These bracelets are made in a large assortment of styles, including the hand chased and the picked nugget finish. Some seen had one large gem set in the central link; others were set with three, five or more stones. Braided and maleable bands of intertwined silver constitute a bracelet that finds much favor, as do braided bands of gold and platinum wire. The flexible and reversible bracelet, known in some localities as the "Indian," has made for itself a very satisfactory record and gives promise of widespread popularity in the future. This bracelet, as old readers know, is finished on both sides, affording two bracelets in one. The box sections being strung on an endless spiral spring, render the bracelet flexible and easily drawn on and off over the hand.

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ABOUT cuff buttons there is little that is new to be told. These show the various styles of decoration seen in other pieces of jewelry. Both single and link buttons are made. The former appear to have the preference with ladies and elderly men, and sell well on the road according to the statements of jobbers and manufacturers. The link buttons are still affected by the younger men in this city.

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EVERYBODY acknowledges the increased use of studs, which are worn now by good dressers with business suits as well as on evening occasions. These studs are, many of them, simply plain little buttons in bright or dull finish, as best suits the taste of the buyer. There are also studs showing the picked nugget finish or hand chasing to match sleeve buttons similarly ornamented. The opal has appeared in some of the new studs; the moonstone also continues to find favor.

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THE increased use of lorgnettes with long handles among New York ladies of society, has resulted in the production of real shell, silver and gold ones, the handles of which, in many cases, are elaborately decorated. One sees these lorgnettes everywhere, at the theatre, the opera and the lecture. In this connection it may be well to call attention to the beautiful gold and silver-mounted opera glasses seen in the shop windows during the past month. A novelty introduced for the holiday season and likely to continue popular, is aluminum glasses mounted with *repoussé* and etched trimmings.

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ARTICLES that sold well during the holiday season and which are always desirable in the jewelers' stock, are lamps, vases and other articles in art pottery, artistic glassware, brass and the like. Many novelties have appeared in copper and iron for the ornamentation of parlors, drawing rooms and dining rooms. The articles appearing this year in wrought iron work show more pleasing patterns and better workmanship than any previous season. Square hanging lanterns of old-fashioned style, with shades of colored glass, are among oddities in wrought iron work. Sconces, mirror frames and sealing wax sets made of solid copper, with satin finish in a dark shade called "royal copper," are among fancies that take well in this direction.

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ARTICLES of silver for the toilet had a tremendous run in this city

during the past month, and afford, at all seasons of the year, safe and desirable additions to the jeweler's stock. In these goods the finish is much of it, at the present time, hand chasing, though there are many beautiful examples of etching and enamel finish.

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IN SILVERWARE, both sterling and plated, the forms are, for the most part, low, and finished in *repoussé*, chasing, etching or the fluted patterns. There is reason to believe that a great deal of the silverware for the spring trade will show the bright finish, alone and in combination with other styles. An already popular effect has been produced with the fluted pattern in bright finish for the body of the piece, with a band or finish of chased work.

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NEW and attractive claret jugs observed, were of rock crystal in high slender forms, with heavily chased silver mountings. Other new claret jugs were of cameo glass with silver trimmings.

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IN WATER pitchers the open-topped silver ones appear to be the preferred sort. An interesting example seen was a conscientious copy, inscription and all, of the famous Endicott pitcher which has been copied in pottery but never before in silver. With the present craze for household articles in colonial style, this pitcher is likely to have a run.

* * * * *

SILVER candlesticks and candelabra are in as great demand as ever, and comes, not only in English, but colonial patterns. There were introduced for the holiday trade by one of our leading manufacturers, individual candlesticks of silver, in small unique patterns, and designed to be placed at each guest's plate on the dining table.

* * * * *

BEFORE dismissing the subject of silver goods, it may, possibly, be well to suggest to the prospective retail buyer who desires to diversify his stock, that silver-trimmed leather goods have proven during the last twelve months, in and about New York, popular selling articles. The card cases and pocketbooks, especially, afford an elegant and at the same time, comparatively inexpensive gift to make on any occasion where more costly goods are not practicable. And this is as good a place as any to say that the long, narrow pocketbooks have proved a success, and promise to remain in style an indefinite length of time.

ELSIE BEE.

Communications.

[THE CIRCULAR is not responsible for the opinions or statements of contributors, but is willing to accord space to all who desire to write on subjects of interest to the jewelry trade. All communications must be accompanied by a responsible name as a guarantee of good faith. No attention will be paid to anonymous letters. Correspondence solicited.]

OBJECTIONABLE COMMERCIAL TRAVELERS.

To the Editor of the Jewelers' Circular:

The little communication of mine which you printed in your November number, relative to cheap and impudent travelers, who

do not fairly represent, so far as decency is concerned, their employers, seems to have hit one of them, judging from his reply in the December number. "The wounded bird flutters," says an old proverb, and Shakespeare remarks, "let the galled jade wince." That is my sentiment precisely. In my former communication I referred to, and especially so stated, a few callow young men who are sent out by cheap firms because they work for almost nothing, who have had little experience in the business and none in good manners, and not to the commercial travelers as a class. On the contrary, I spoke in laudatory terms of the business capacity and gentlemanly manners of the travelers as a class, and certainly none entitled to be considered respectable could have taken offence at my remarks. Indeed, the very purpose of those remarks was to show employers that they make a mistake in sending out cheap men, and to this extent my letter was a plea for ability and intelligence. Evidently my critic does not belong to the class that possesses these or he would not take exceptions to my statements, to the effect that these young, inexperienced and offensive travelers bring discredit alike upon their employers and an honorable and legitimate calling.

I cited a case of impertinence on the part of one of these cheap men which led me to eject him from my store. Does my critic wish it understood that he upholds and defends insolence and indecency? I might have added to my story the fact that the same young man I referred to got drunk at the hotel, and was turned out of the house at night because of his insulting manner towards some ladies. Does he who signs himself "One of the Objectionable Ones" wish to be classed among such puppies as this one? I take it for granted that he does not, but, under the supposition that I had attacked commercial travelers as a class, he felt bound to defend them. They need no defence from anything that I may say, unless they persist in fellowshipping with and defending those who are bringing disgrace upon them.

While I am free to accord to the great majority of commercial travelers the possession of excellent business ability, good judgment and good manners, I still feel free to ask the question "are commercial travelers necessary to the transaction of our business?" In doing this I do not cast any reflections upon the travelers, but submit the question from an economical view of the situation. A good traveling salesman is worth probably \$2,000 a year as salary, and his expenses will eat up \$10 a day in addition. Some firms employ two, three and even half a dozen men at about these figures. The aggregate cost in the course of a year for selling goods in this manner is something astounding. The cost is, of course, added to the price we dealers have to pay for the goods we buy. We in turn shoulder this off upon our customers, thus adding to the cost of the goods to the consumer. I am aware that the jewelry trade is not alone in employing commercial travelers, but the fact that the system is general does not prove that it is the most economical method of selling goods. It is scarcely possible that anything I may say will revolutionize a system that is almost universally followed by all who have goods to sell, but my protest against insolence, profanity, drunkenness, and indecency may have the effect of convincing employers that they are injuring themselves when they send out men who are addicted to these vices. Although my critic signs himself "One of the Objectionable Ones," I am convinced that he would decidedly object if he found himself in company with this class of persons, and would resent being called one of the objectionable ones such as I have referred to. While my remarks referred to a damaged sample, he has held them as applying to the entire stock. I do not expect to live to see the day when commercial travelers will be dispensed with—indeed, it is an open question whether a less costly method of selling goods can be found—but I do protest against the firms that I do business with sending drunken "bummers" to visit me and insult me and my customers in my place of business. If my critic is one of this kind I am sorry for him.

G. R. T.

Kansas City, December, 1886.

OBJECTIONABLE DRUMMERS.

To the Editor of the Jewelers' Circular:

I agree with your Kansas City correspondent that there are some travelers for respectable jewelry houses who are unfit to be on the road, and who disgrace not only themselves but their fellow travelers, their employers and all who are brought in contact with them. I have had some encounters with these drunken vagabonds, but knowing that they are exceptions to the general rule, I should not have said anything about it had not some one attacked your Kansas City correspondent because he did venture to enter a protest against such men being sent out to represent respectable houses. There is no class of men but has its disreputable hangers on, and commercial travelers must not expect to be free from them. But because one of these vagabonds is alluded to in print, the respectable ones have no cause to feel aggrieved. I can testify to the fact that travelers for both New York and Chicago houses have been in my store when they were too much intoxicated to do business, and that ladies have left the store because of the profane and filthy language used by them. As they represented respectable houses, I did not feel that I was justified in having them arrested, as I would any town bummer who had behaved as they did, and so I tolerated them till I could get rid of them quietly. Although I have been in business twenty years, and have met hundreds of travelers, I never had occasion to complain of but two, so that I regard the record as highly creditable to travelers as a class.

Our Kansas City friend seems to think that we could get along without commercial travelers. So we could most undoubtedly; our forefathers used to get along without railroads, without telegraphs or telephones, electric lights, or many of those conveniences that are recognized as necessary in these more progressive days. But do we want to go back to the days of our grandfathers? Commercial travelers are one of the modern conveniences for doing business, and we could no more dispense with them than we could with the railroad train or the telegraph. I know that they save me a great amount of expense and valuable time by bringing the cream of the market to my very door and giving me the chance of selection without any trouble on my part. I am aware that the cost of keeping a traveler on the road is added to the cost of the goods he sells, but that cost is divided between so many that the burden thus placed upon each individual is not perceptible. I am a believer in commercial travelers, but not in drunken vagabonds who are a disgrace to their kind, but who occasionally steal the livery of the traveler to serve the devil in.

R. S. D.

Buffalo, Dec. 20.

KIND WORDS FROM VALUED FRIENDS.

A subscriber in Atlanta writes: "I am ashamed of myself for letting my name be dropped from your list, and enclose \$2 to renew the subscription. I cannot do without THE CIRCULAR, and I beg you will not let it stop again, but consider me a perpetual subscriber, and send me a bill when I owe you anything."

A subscriber in the interior of the State says: I have taken THE CIRCULAR for thirteen years and cannot keep house without it. It grows better with each volume, and is simply invaluable to anyone engaged in the jewelry business. I enclose \$2 to renew my subscription."

Here is what a manufacturer in another city says: "Please find enclosed \$2 for my subscription to THE CIRCULAR. It is needless to say that it is a pleasure to renew my subscription. I consider THE CIRCULAR a monthly supplemental encyclopedia of the business."

A Michigan subscriber says: Send THE CIRCULAR regularly to my new address. I have been taking it for over twelve years, and would as soon think of being without my wife as without THE CIRCULAR. There is scarcely a day when I am at work that I do not refer to it for something and I seldom fail to find the information

I want. I only wish you would make the indexes somewhat fuller, so that references to back numbers could be made a little easier. But I know that it takes much time to make a complete index, and I don't suppose that everybody would be satisfied whatever you might do. However, it is not a matter of very great consequence so long as I have THE CIRCULARS themselves."

HOLIDAY STOCKS OF OUTSIDERS.

To the Editor of the Jewelers' Circular:

Constant reference is made to the excellent trade enjoyed or expected by the manufacturers and jobbers, and they seem to expect that we retail dealers will also partake of the holiday feast of trade prosperity. Do they ever stop to think upon how much they are doing to render our feast one of husks? You know, of course, that the leading dry goods houses in this city have recently branched out as retail jewelers, and that they carry full lines of watches, cases, and jewelry of all kinds. These goods they sell at retail at jobbers' prices, never stopping to inquire whether the purchaser is in the trade or not; all they care to know is that he wants the goods and has the money to pay for them.

Then, as Christmas drew near, it seemed as though every fancy store and toy shop in the city blossomed out with a full assortment of jewelry, which they advertised, by attractive placards, as being for sale at less than cost during the holiday season. Even up the back streets the little thread and needle stores had their samples of jewelry displayed to the best advantage. I had the curiosity to glance through some of these stocks, and found that they consisted of some of precisely the same goods that I had in stock, and that they were selling at prices below what I can afford. Of course all this cuts into our legitimate trade, and if our Christmas dinner is inferior in quality this year to its predecessors, we must attribute it to the excessive competition that we have had to encounter.

But what strikes me as the funny part of this business is the fact that no one sells these goods to the outsiders; neither manufacturers nor jobbers, East or West, ever sell a dollar's worth except to the legitimate trade, and every one of them would feel deeply insulted if you were to suggest the contrary. How, then, do these outsiders get their goods? I think that, like Topsey, the goods must "growed." There are a great many things I find in this world that are unaccountable, but nothing that puzzles me more than this same conundrum, "how do the outsiders get their goods?" I simply know that they do get them and at prices that enable them to sell at even lower prices that I can afford to do, yet nobody supplies them. The number of persons having jewelry for sale for the holidays was never so great as this season, when jobbers have been more strenuous than ever in declaring that they do not sell to outsiders. It was St. Paul, I believe, who said "all men are liars;" I wonder if he was not a retail jeweler, and if he did not refer to the jobbers he bought goods from?

There is one thing to which I have made up my mind; I bought a liberal supply of holiday goods expecting a demand rather better than usual; I find that all the outsiders must have done the same thing; therefore, if my sales turn out badly, I shall know that it is because of the extra competition the jobbers have forced on the legitimate trade, and I shall not worry especially if I can't meet my paper as it falls due—I shall let the other fellow do the walking for a time. I have always been a "hundred cents on the dollar man" heretofore, and have prided myself on paying my debts promptly, but I own I am getting somewhat discouraged. I find the very men who look to me to pay promptly are the ones that are doing all they can to prevent my doing so; that is, they are selling to anybody and everybody as low as they will to the regular dealers, thus building up a competition that the regular dealers cannot stand. If some of us get bowled under in the effort to keep our end up, thereby entailing loss upon our creditors, those creditors will have only themselves to blame. It looks to me as though the jobbers were

killing the goose that has been sufficiently a goose to lay golden eggs for them. Where these bad practices will lead to eventually no one can foretell, but it looks to me as though the race of retail jewelers would soon become extinct and that the age of bazaar men and fancy goods and toy dealers was coming in.

SILVER PLATED WARE ON THE INSTALMENT PLAN.

To the Editor of the Jewelers' Circular:

Having noticed in the daily papers advertisements to the effect that Jones & Robinson, in the Bowery, would sell silver plated ware on the instalment plan, and would, furthermore, call at your house with samples, I thought I would find out what their little game was. So I dropped them a postal asking them to call with samples. Next day a young man came to the house with samples of plated ware which he displayed to the admiration of the servants in the kitchen, who seemed wonderfully taken at their cheapness. I recognized the stuff at once as being of the thinnest possible plate, the goods, in fact, that are made for the swindling auction rooms. The dealer offered to sell them for one-half cash, the balance to be paid in monthly instalments at the rate of \$5 a month. I was expected to sign a paper authorizing the dealer to take his property back again in case I defaulted in any payment, and to forfeit whatever had been paid on them. The paper was so cunningly worded that the dealer did not surrender his title to the goods until they were entirely paid for, and, no doubt, the courts would have been obliged to hold that the goods were actually his and that he could take them away if the payments were not made as specified. The fifty per cent. of alleged value demanded as first payment would have fully recompensed him for the cost of the stuff, and all he got above that was clear gain. I made some inquiries about this instalment plan, and found that a large proportion of those who buy goods in this way forfeit them from one cause or another, and that the dealer then sells them again to some other customer. He has a good thing of it, as his dealings are mostly with ignorant women, who are easily tempted to buy the goods without knowing where the money to pay for them is to come from. After paying for a month or so, the time comes when they cannot pay, and then the inexorable dealer takes back the goods, and the poor woman loses all she has paid. The success that has attended the men who sell furniture on the instalment plan has induced dealers in other lines to follow their example, and now the impecunious and improvident can get almost anything they want on this plan, from furniture and clothing to silver plated ware and false teeth. But the game is a swindle from beginning to end, both as to the quality of the goods and the terms of payment, as well as to the prices charged. I do not know how long this silver plated ware dodge has been worked, but it was new to me, so I looked into it. It would be well if the poor and ignorant portion of the population could be put on their guard regarding it.

M. P. R.

New York, Dec. 18.

Silvering and Silver Plating.

PLATED SILVER.



THIS IS OBTAINED, says A. Roseus, by rolling together a plate of copper of the first quality, and one of silver; these are either welded or simply united by placing their hot and clean surfaces together, wetted with a concentrated solution of nitrate of silver. The two metals are reduced and drawn out about equally by the pressure of rolls, and long sheets or bands of silvered metal are thus obtained, with which a great many articles may be manufactured. By this mode of operation a great quantity of material is lost, as the objects have to be cut out from a sheet entirely silvered, and the waste retains a large proportion of that metal; the cut sections

present parts without silver, which must be hidden by ledges, or by silvering by another method. There is also the absolute necessity of employing pure copper, which is more costly, less sonorous, and not so tough as its alloys; but the greatest defect of the process is the difference of thickness of the silver, according to the shape of the object. Raised surfaces are the most exposed to friction, and it is just there that the coat of silver is the thinnest; the conditions are reversed with electro silvering, and the parts in relief receive a more abundant deposit of silver, which is a satisfactory result. The best plated silver is manufactured by applying upon an ingot of pure copper weighing 9 parts, another ingot of silver weighing 1 part, to coat one side only; add another coat of silver, if it is intended to coat both sides. The two are rolled together until the desired thickness is obtained. The silver of the plated metal will be bright, if the rollers are well polished, and dull with rough rollers. The only solder which does not injure plated silver is tin solder; and when the objects manufactured are required to resist a warm temperature, nuts and screws are employed.

The electro plating of old ware made from copper with a covering of silver, is often difficult. Supposing it is required to electro an old cruet stand, the bottom is separated from the wire, either by unsoldering or unscrewing. Smooth by emery or pumice stone and water, or by powdered bath-brick, brushed over with a hard brush. Spots of verdigris are removed with a few drops of hydrochloric acid. The great difficulty exists in giving a good electro deposit upon the edges or mounts where there may be some lead or lead solder; apply to such parts, with a rather soft brush, a solution made by dissolving 4 ounces of mercury in nitric acid, and adding about half a pint of cold water. This solution is lightly brushed over the lead mounts only; the article and brush are then to be well rinsed, and the brush and plain water to be applied in the same way. The solution of mercury will turn the edges black, or dark gray, but the subsequent brushing will render them bright again. The frame, when well rinsed, is ready for the depositing bath. If, on its first immersion, any black spots appear, the frame may be removed, again brushed over, and finally returned to the bath; if the edges do not receive the coating of silver as readily as the other parts, the solution may require a little more cyanide, or a greater battery power, or an increase in the surface of the anode. These lead edges may be prepared for receiving the silver deposit by a previous coat of copper applied as follows:

The edges are plunged into a solution of sulphate of copper with a little free sulphuric acid in it; then by touching the lead edge with an iron wire, it is immediately coated with a bright deposit of copper, which is rinsed and becomes a good conductor for the further electro deposit of silver. The coating of tin underneath the bottom of cruet frames is very difficult to plate, unless in a solution made expressly for it; therefore it is preferable to remove it either with abrading materials, or with nitric acid employed with care. This process of depositing copper will be found useful not only for old plated ware, but also for many articles on which are found unruly spots of tin solder.

SILVERING WITH SILVER FOIL.

This method is never practiced except upon objects already manufactured in their definite shape, and is adapted to all kinds of copper, bronze or brass. It is, in certain respects, superior to plated silver, but is very difficult of execution, and has less adhesion to the metal underneath. After annealing the articles they are thrown, while hot, into a bath of sulphuric acid, with a small proportion of hydrochloric and nitric acids. They have, then, a dull and dead luster, owing to a multitude of small holes, which are so many points of attachment for the silver foil. The objects, thus prepared, are lightly fixed upon an iron rod, which is held in a vise. Their temperature is raised to about 300° Fahrenheit, by means of incandescent charcoal put at the proper place, so as to open the pores of the metal, which, by cooling afterwards, will imprison the silver applied. The silver foils, taken from the book with small tweezers, are cut to the proper

size upon a cushion with an ivory or steel knife. After each foil is deposited upon the object, it is made to adhere by a light pressure of a rag pad, and afterward by the friction of a steel burnishing tool. The parts of the silver foil which do not adhere are removed with a soft brush. Gold beaters prepare silver foil either with bright or dead luster. The latter is made to adhere only by the pressure of the pad and not by the burnishing tool. This dead luster cannot compare in fineness with that obtained by the battery; however, it resists handling and the sulphur gases of the atmosphere better. Articles thus silvered are only burnished after all the silver foils have been applied. Round or cylindrical objects are burnished upon the lathe, other forms by the hand; there are always places and lines showing the vibrations of the burnishing tool.

This method of silvering is only employed for very large objects, such as high chandeliers and other church ornaments. Spoons and Forks may be covered with a silver foil as follows: first, slightly silver with a dead luster in a silver bath by dipping, heat, and then cover with silver foil by the pressure of an iron scratch-brush striking vertically, forcing the silver foils into the pores of the metal underneath. Burnish by the usual method; it is impossible to obtain a dead luster by this method.

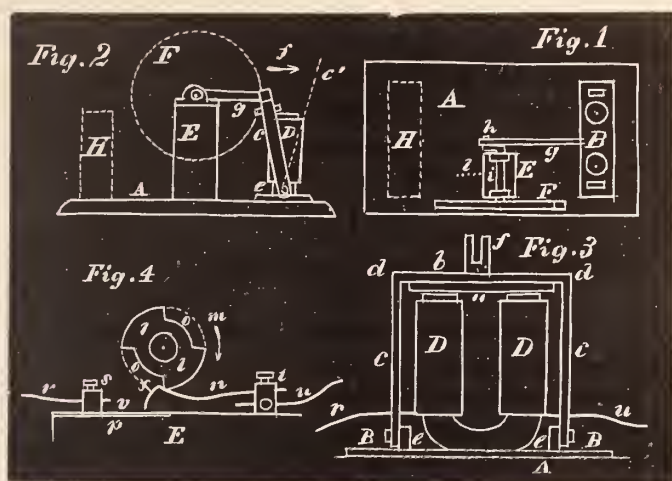
Free Hand and Mechanical Drawing.

BY EXPERT.



MEMORANDA drawings should always be accompanied by descriptions or specifications sufficient to enable a skilled mechanic to construct, and about as good a standard for such requirements is the conditions insisted upon at the U. S. Patent Office, only in our case the drawings need not be so carefully executed. Some of my readers may think such precautions are unnecessary, but the writer's experience fully sustains him in the conviction that "anything that is worth doing at all is worth doing well." This is an old adage but a very true one. And, more than this, many inventions are lost to the world by an idea which prevails with most people, that it requires an experienced patent solicitor to procure a patent. This is a great mistake. Very few patent solicitors have any practical knowledge of the device they are making claim for; it is much better the inventor should be able to do all this himself, he knows exactly what he has invented, and in this day but few business men exist who are not educated sufficiently to intelligently describe any mechanical device. Such knowledge, with a moderate skill in pen drawing, executed in conformity with the rules of the Patent Office, is all that is necessary. I have been led to speak to this extent of descriptions in conjunction with drawings, to impress on the reader the importance of making the record complete. Suppose we were impressed with some mechanical idea and we wished to make a drawing and memoranda of it. If we had time, and the project seemed feasible, and we were impressed that the invention would be a valuable one, we should elaborate it by drawings and description in all the details. It is not necessary any set form should be used; all we want is a detail drawing and description. To illustrate, we will take our electric motor mentioned in December number, and proceed with the drawings and description as follows. I will construct my electric motor on a base board of black walnut, 10 by 15 inches, shown at *A*, fig. 1. Near one end I screw a heavy brass plate *B*, made of about No. 7 brass, 4½ by 2 inches. On this I erect my electro-magnet *D*. This magnet differs in no essential feature from those in common use. What I claim as new and original is the manner of utilizing the force of the magnet as exerted on the armature *a*. The armature *a* is attached to a gate formed of 3 pins, *c b c*, fig. 3, joined rigidly at the angles *d d*. The gate *c b c* is jointed to the brass plate *B* by means of screws in two studs *e e* fastened in the brass bed *B*. This permits the gate *c b c* to oscillate back and forth over the magnet *D*. The

armature a is placed as near the magnet D as possible and not touch, in order to realize the greatest force of the magnet. At E , figs. 1 and 2, is a block firmly attached to the bed A ; on this block is mounted a shaft i , on one end of which is a crank h and on the other a fly wheel F . Extending from the stud f to the crank h is a connecting rod g . It will be seen that as the crank h revolves, the armature a will vibrate back and forth over the magnet D . In order to utilize the magnetic force, I place the armature a and crank h in the position shown in fig. 2. If, now, a galvanic current is made to flow in the wire around the magnet D , the armature a will be drawn forcibly over the magnet D . The current is only permitted to flow through the coils of wire surrounding the magnet D , until the armature a is directly over the magnet, when the circuit is broken, and the impetus acquired by the balance wheel F carries the gate $c b c$ over to the position shown at the dotted line c' , fig. 2, at which point the battery current is again caused to flow in the wire surrounding the magnet D , when the armature a is drawn again over the magnet and a second impulse obtained. By placing another magnet and gate with armature on the opposite side of E I can utilize the galvanic current constantly, consequently realizing the full dynamic force of the electric current. The manner of completing and break-



ing the circuit is shown in fig. 4, and consists of disc l attached to the arbor i and a device fastened to the block E . The disc l is cut into two quadrants as shown, the dotted lines showing the form of the wheel before the spaces $o o$ were cut away. The principle on which the circuit breaker l works is: the dotted outline at E , fig. 4, shows the wood block which supports the bearings for the arbor i . The quadrant wheel l is mounted on the arbor i , at the point indicated at the dotted line l , fig. 1. It is well known wood is a non-conductor, so we mount two studs, $t s$, on the wood block E ; into these studs the insulated wire wound around the magnet D terminate. The stud s , fig. 4, is attached to a plate p as shown. The stud t is simply screwed into the block E , and serves to hold by set screws the end of the wire u and the copper circuit breaker n . It will be seen if the disc l is revolved in the direction of the arrow m , fig. 4, it will strike the spring n , at x and press the point v to the plate p and complete the circuit, and D becomes magnetic. The point of n at v should be made of platinum, and also a piece of the same metal set in the plate p to prevent deterioration by the passage of the electric current through any inferior metal. If another magnet and attendant fixtures are placed opposite D , at H , fig. 2, we nearly double the power of our motor with the same battery. In this case we should have to have another circuit breaker like the one shown at fig. 4. This is, of course, arranged so when the current is not flowing through n it would be passing through the new magnet at H . There would have to be two cranks at h standing at right angles to each other. Here is our electric motor complete, with drawings showing the working parts in detail. True, it is not to any scale, but the size of the bed A and the magnet D , together with the size of the insulated wire for winding the magnet D are given, and no intelligent mechanic would have any difficulty in going on to

construct one. Indeed, such a drawing would enable the builder to realize a machine quicker and cheaper than if the parts were given to a perfect scale. For instance, if the arbor i was drawn to $\frac{1}{16}$ in diameter, this is the size it must be; while in reality, if it was $\frac{3}{8}$ it would be just as well. The proper adaptation of part to part is all that is required. In such drawings, where the size of parts are important, it can be given, but in 9 cases out of 10 exact size is of minor consequence. Such a little motor as we have just described is capable of exerting quite a little power, and could be used to run a light lathe or any other small machinery. The cranks at h should be about $\frac{1}{2}$ inch, the balance wheel F 5 inches in diameter and weigh about 1 pound.

Correspondence.

Chicago Notes.

To the Editor of the Jewelers' Circular :

The jobbing jewelers of Chicago are unanimous in reporting 1886 as a year of marked progress and success. All the leading houses are entirely satisfied with the condition and prospects of trade, and have to report a decided increase over the previous year's business. The increase varies from 10 or 15 per cent. all the way up to 60 per cent., and it is safe to say that the average increase in business is from 20 to 25 per cent. Making allowance for the reduction in the prices of goods and the interference with trade caused by the great labor strikes, the showing is an eminently satisfactory one, and may well lead jobbers to wish one another a "Happy New Year," and look forward to 1887 with well grounded hopes of still better things. All the indications are that a healthy revival of trade has set in, and that the experiences of 1881 are to be repeated, if not excelled. One leading evidence of the improvement in trade is the increasing demand for the better classes of goods. People are beginning to tire of the 14 karat goods which have satisfied them for some years, and the demand for 18 karat watches, and especially ladies' jewelry of that grade, is largely on the increase. The trade has been steadily getting into better shape. Country dealers are paying their bills better than they have done for several years, and are not owing nearly so much. There have been very few failures during the year, and consequently the losses of jobbers have been very slight. A tendency to stringency in the money market and a falling off in the retail trade, have told unfavorably on certain other staple lines of business during the past month, but the jewelry trade has suffered but little from either of these causes so far.

The following reports from the leading jobbing houses in the city will be of interest to the trade at the present time:

Benj. Allen estimates that his business will run fully 10 per cent. ahead of 1885, and is thoroughly satisfied with the outlook. December was considerably ahead of the corresponding month of 1885, and October and November showed a very marked increase. The improvement was pretty evenly distributed over all departments, and more than equaled Mr. Allen's anticipations. The firm is experiencing a growing demand for the finer grades of goods. Lapp & Flershem had a very satisfactory year, every month showing larger returns than the corresponding months of the previous year. They find collections good, look upon the trade as particularly healthy, and expect even better things during 1887. Their business during December was unprecedented, exceeding anything they have experienced since they started in business. They report, also, a considerable increase in the diamond department of their business. Clapp & Davies think trade to be in excellent shape, and figure on being quite 20 per cent. ahead of last year. Otto Young & Co. are having a splendid run of business, and reckon their increase for the year at from 10 to 15 per cent. Mr. Alister, of B. F. Norris, Alister & Co., says business is better than at any time since 1881

and 1882, and feels certain that his increase for the year will not fall short of 25 per cent. His travelers in Michigan, Indiana, Minnesota and Iowa, have had an excellent run of business and send in most encouraging reports. His showing for December comes well up to the figures for 1881 and 1882. Giles, Bro. & Co. report business in their jobbing department to be exceptionally good, and calculate their increase for the year at fully 33 per cent. They find the retail business pretty fair, but think it has been a little late of coming in. They intend shortly to double or treble their facilities for work in their manufacturing department.

C. H. Knights has had a year of extraordinary success—the best, by far, since he started in business. His business has exactly doubled itself since the beginning of August, and his increase for the year will not, he says, fall short of 60 per cent. He recently established a tools and material department, and has met with most encouraging success in this new departure. Mr. Knights has now five men on the road who cover all the country west of Ohio, and they have had an excellent run of business. Only in Southern Iowa, Missouri and Southern Kansas have they experienced anything to amount to dullness. Mr. Knights has had an usually brisk holiday trade, and considers business in much better shape than it has been since 1877. Stein & Ellbogen's sales have been 30 per cent. in advance of last year, and they anticipate that their profits will make a similar showing. Their business in diamonds, which has undergone great development during the last few months, has proved a most gratifying success. Cogswell & Wallis have been doing an excellent steady business, and will come out from 15 to 20 per cent. ahead of last year.

M. C. Eppenstein has experienced a marked increase in the volume of his business, and the same may be said for Holmes & Edwards and the Hartford Silver Plate Co., who do business in the same building. The Towle Manufacturing Co. maintains its character for energy and enterprise, and introduced many elegant novelties for the holiday trade. The Gorham Manufacturing Company finds its business here only limited by the supply of goods. Henry Oppenheimer's Sons are doing a safe and conservative business, and have had their share of the year's prosperity, while Perry & Mead report that they have fairly doubled their business.

The Elgin National Watch Company will show an increase of at least 25 per cent over the previous year's business. Their trade has been limited only by the ability to produce. The American Watch Company's Chicago agency is from 15 to 20 per cent. ahead of its figures for 1885. All the clock companies have been doing an immense and almost unprecedented trade.

Quite a ripple of amusement was stirred up in the trade early in December, by the announcement in a local paper that a consignment of goods to Otto Young & Co. had been confiscated by the customs authorities for failure to pay duty. The alleged consignment of goods turned out to be a sample English watch case, worth in the neighborhood of 85 cents.

The local manufacturing jewelers have been unusually busy during the last season, and there are indications that in the near future there will be a demand for manufacturers who will, something after the manner of the Eastern manufacturers, lead in new styles of goods for the Western jobbers and retailers.

The Chicago Jewelers' Association has appointed a committee to arrange all the necessary details for the annual banquet, which will be held during the first or second week of January.

F. E. Morse has just issued a most unique and superb catalogue that far surpasses all his previous efforts, and can only, by a careful method which he adopts, reach the hands of legitimate jewelers.

R. A. Kettle, the Chicago agent of the American Watch Company, has just returned from his final tour for 1886 of St. Louis, Cleveland, Cincinnati, Detroit and the other large cities of the West. He reports business "booming."

Mr. Prall, of the Elgin National Watch Company, has received a communication from the Mayor of Charleston, asking for the names

of the individual subscribers to the relief fund, in order that each may personally receive an acknowledgement of thanks.

W. A. B.

Trade Matters in Providence and Vicinity.

To the Editor of the Jewelers' Circular :

The year just closed has been one of prosperity to the manufacturer, and the best in a business point of view since the year 1883, when the sales were heavier than ever before in the histories of many of the firms located in this city. The concern that has not a neat sum placed to its credit on the ledger as the result of the year's business just ended, must be a firm that is possibly not exactly dead, but sleeping. These are the firms who do not furnish original ideas in their lines of business, but merely follow in the footprints of those who go ahead and take the lead, and are merely pirates, not pirates of the sea, as the word is generally used, but pirates of the ideas which they employ to further their business interests.

A growing abuse of the trade is in the paying of expressage on goods from the manufacturer's place of business to those of the jobber, who expects that his order shall be delivered to him, possibly in San Francisco, at the figures that he may buy at in New York or this city. In the dry goods business this is all different. A customer in San Francisco buys a bill of goods in New York, but he does not expect to have them delivered to him express or freight paid, but even pays for casing and drayage on same in New York in addition to freight charges while in transit. Why, then, should the manufacturing jeweler do so much more for his customer than is done in almost any other line of business? Simply to hold his trade, you will say, possibly; but the remedy for the abuse lies with the manufacturers themselves, and until they take some decided action on the subject the abuse will continue, as the precedent has been established so long that it has become a custom. Another mistake the manufacturer makes is to rush the trade, that is, to force the jobbers to buy goods out of the season whether they are ready or not. Some firms at present have their salesmen ready to go on the road to sell the spring trade, which will hardly be through taking account of stock for at least two or three weeks to come. But the eagerness of the manufacturer to sell his goods, in a measure, has a great deal to do with the overloading of the market and consequent dull times in the trade, because the jobber is stocked up with undesirable goods that he cannot rid himself of, and therefore in time he finds himself in a hard strait to pay his debts, from the reason that he cannot turn his goods on hand into cash, simply because they do not sell.

Several instances have come to light the past year where jobbers have allowed their standing with the manufacturer to get in bad repute, seemingly for the object of forcing from him an extra discount to settle the outstanding account. But in some instances this "bluff" game fell very short of its object; in others, where the manufacturer was badly scared as to the real financial standing of the party, it succeeded, as originally intended by the party working the scheme, which, to say the least, is not very reputable. The main idea with some disreputable parties is how can we beat the manufacturer, and it would appear that a great many sleepless nights are spent in trying to solve this (to them) important problem, so that the manufacturer is never surprised at anything of this kind that comes to his notice. In regard to the business for the coming season it is simply conjecture as to what it will be, but to judge from the season just past it should be a real boom, something like the fall of 1883, but time will tell its story, and we trust it will be well told, financially speaking. The manufacturers are now devoting their time and brains to the object of getting out new designs for the spring trade, and the results will likely be most pleasing to jobbers.

The number of failures for the year have been light in contrast with past years. Some cases where the manufacturer has, against his best wishes to do so, divided the profits with the jobber, might be named.

The Plainville Stock Co. are still running until nine (9) o'clock at night, and during the month past have added a number of new hands to be able to keep up with their orders. They are getting out new and elegant designs for the coming spring trade.

Messrs. Hudson & Farnum are having heavy sales for their "Popular Nonpareil" bracelet. They will soon introduce to the jobbing trade their new patent wire spring bracelet, "The Daisy," for which they have great expectations.

Mr. C. F. Irons showed for the holiday trade a great number of novelties in pins and charms, some of which were very unique and elegant.

Messrs. Howard & Son are as lively as ever on new designs for the spring trade, and the jobbers will be surprised to see that all previous attempts of this live house have been completely outdone in this, their latest, line of designs for the spring trade about to open.

FAIRFAX.

Providence, Dec. 15, 1886.

* A Complete History of Watch and Clock Making in America.

[By CHAS. S. CROSSMAN.]

Number Seven.

Continued from page 400.

E. HOWARD & CO., THE E. HOWARD WATCH & CLOCK CO. AND THE NASHUA WATCH AND CLOCK COMPANY.



THIS LINE of nickel movements made a new demand for watches in the adjusted grades. The company had previously divided their production the same as they do at present, viz., into three qualities; first, plain; second, adjusted to heat and cold; and third, to heat, cold, position and isochronism. All the grades are, of course, adjusted to the latter condition. So far as the writer is able to determine, this company was the first one in America to adjust to all of the six positions; the limit was placed at eight seconds as the sum of the errors allowable in all positions. Mr. Geo. P. Reed was the first one to do adjusting in the factory, but after he left the company's employ the adjusting department was put in charge of Mr. Jewett, who remained there some years, and was then succeeded by Mr. Albert Horton, who was his former assistant. Mr. Horton still has charge of this branch of the work, assisted by Mr. H. N. Allen.

There are still many points with reference to the production of this company that could be spoken of with profit and interest, but brevity is enjoined upon the writer at every sentence. It might be mentioned, however, that Mr. Howard designed and made a few sample movements aside from those which became the regular production of the company.

In 1863 he made three eighteen size movements with the fork at right angles to the escape wheel and put in cylindrical hair springs, but he concluded it was not best to ask the company to undertake the manufacture of a watch of that kind. He also made a few "I" and "K" size movements; the "I" size had a "Reed" barrel, but the other had a going barrel of the usual form. Neither of these movements were ever manufactured by the company. In the matter of dials the company have always adhered to a hard enamel. In 1878 they decided to discontinue the manufacture of key winding movements, and all the key wind movements were put in the hands of the jobbers and closed out. Before going on to note some of the business changes which took place in the company, the writer wishes to mention the names of some in their employ who have contributed both to the high standard of workmanship, which has always characterized these watches, and helped to make the company a financial

success. The names of John Holden, A. B. Winslow, J. R. Howard, Edw. H. Grant, H. E. Fay, Leonidas Murray, I. H. Sloan, Albert Horton, Albert McIntosh, Abel Cook, Wm. Walden, L. B. Raullet, W. H. Bradford and J. W. Bell are all worthy of mention, having, as heads of their respective departments, done much to further the welfare of the company. As to the total production of this company it must be borne in mind, as was stated at the outset, that Mr. Howard, who was at the head and front of this plant from the first, always held that they must make the best watch in America, and, of course, while striving to fulfil these conditions, they could not produce watches on as large a scale as some of the other companies. The average production for some years past has been about one hundred watches per week, with a force of two hundred employees, including those employed in the clock factory, which numbered about one hundred.

The clock business has its share of history given in another connection. The reader will now, perhaps, be interested in a very brief glance back at the business career of the company. The last date mentioned was 1863. Business ran along quietly from that time; while they did not always crowd it, they always had a good expectancy for the future.

The following is quoted from the Treasurer's report for 1867: "The business of the company has been of a very satisfactory nature, though no dividends have been declared; money has been made but expended in improvements; though business at present is somewhat dull, your Treasurer thinks he will be able to keep the works running." So the business went along. At the annual meeting in 1869, the Treasurer was authorized to purchase a piece of land adjoining the watch factory as the site for a clock factory, which was afterwards erected and has since been occupied by the company. At the annual meeting in 1877, Mr. R. S. Lakin was elected a director in place of Thomas Howard, deceased, who had been connected with the clock factory for many years. No business of great importance was transacted by the directors in 1879 and 1880, the same officers being re-elected. In 1881 a new company, called the E. Howard Watch and Clock Co., was formed, which purchased the plant of the old company. It was composed of a few gentlemen, some of whom were engaged in other business in Boston, who thought they saw a good investment in it. The capital was placed at two hundred and fifty thousand dollars. Mr. Edward Howard was elected President, but in this office he was succeeded the following year by Mr. Samuel Little, who is the present incumbent. Mr. Chas. J. Hayden was elected Treasurer and Business Manager, and Mr. Albert Howard, General Superintendent. Mr. E. Howard, after retiring from the office of President, severed his connection with the company. Mr. Little, his successor, while not a practical watch manufacturer, has had a wide and varied business experience in Boston which the company are getting the benefit of. The same may also be said of the Treasurer. While the new management brought new capital and new life into the company, they have not made any changes of importance in the production. They continued to use the same trade mark and engraved all the watches "E. Howard & Co.," the same as all the predecessors have done. In May, 1884, an addition was made in the way of a new stem winding eighteen size movement made to wind at figure 12 for open face. It was designed by Mr. J. W. Bell, the inspector. It certainly reflects great credit upon his superior mechanical ability. Before closing the history of this company, it seems fitting that a few words should be said with reference to the struggles of Mr. Edward Howard during the earlier years of his connection with the firm of E. Howard & Co., and the company which succeeds them. He, as has been said, stood at the head and front of the enterprise, and it was only by his skill, perseverance and ability that the business was made a successful one. He may truly be called the foremost man in America in the matter of producing watches of superior quality at that early day.

Mr. Albert Howard, who, though not as conspicuous as Mr.

Edward Howard, also contributed his share towards the success of the enterprise.

NASHUA WATCH COMPANY.

This company was located in the town of Nashua, New Hampshire. The fact of that location being chosen can be easily accounted for, as the prime mover in the organization and the man who furnished the greater part of the capital, both resided there. Mr. B. D. Bingham had been in business in Nashua, and had, in addition to his watch and jewelry business, made a few clocks and regulators; but he decided to give this up, as he desired to know something of watch manufacturing. He went to Waltham and entered the setting up room. Here he had the opportunity of meeting Mr. N. P. Stratton, who was desirous of doing something in the way of manufacturing a fine movement. They visited Nashua together in the fall of 1859 with this end in view. Mr. S. W. Noyes, or "Col." Noyes, as he was usually called, stood ready to furnish the larger portion of the capital required. A company was soon formed with a nominal capital of \$100,000. Mr. Virgil C. Gilman was elected President, Thomas W. Lovell, Secretary, and Leonard W. Noyes, Treasurer. The company purchased the old Washington Hotel, and moved it on to a small plot of ground which they had purchased in the south part of the town. They enlarged the building by an "L," and repaired and altered it so they had a good factory for an outlay of less than three thousand dollars. Mr. N. P. Stratton took the position of superintendent, Mr. C. S. Mosely, of Waltham, that of master mechanic, and Mr. Bingham acted in the capacity of model maker and master watchmaker, also later taking charge of the finishing room. Mr. C. V. Woerd first assisted in the building of machinery and afterwards was foreman of the train room. Mr. James Gooding was the foreman of balance making, and it was while here that he invented the system of balance making essentially the same as that now in use in all the American factories. Mr. J. H. Gerry made the escapements under the general direction of Mr. Bingham, Charles Blake had charge of the plate room, Josiah Morehouse was in charge of dial making. The gilding was done by James Fairchild and the jewelery by Frank Robbins, now of Waltham. They commenced operations in the matter of building machinery late in the fall of 1859, no facilities for buying it already made being afforded then as now. The watch, which the company decided should be a fine grade, was modeled by Messrs. Bingham, Mosely and Stratton. The jewels were first set in the top plate and the train made to conform to them as far as possible. That is to say, the train was constructed with a view to the artistic appearance of the top plate as well as performing its other functions. The movements were made both 16 and 20 size three-quarter plate, gilt, with exposed pallets, which was the first effort in the way of exposed pallets, and a really fine three-quarter plate movement that had been made in America. They were all adjusted to heat and cold and had Stratton's patent barrel. This operated quite opposite to Reed's patent. In principle it is about the same as putting a mainspring barrel on an English main wheel, instead of having a fuzee there.

After getting the machinery well under way they commenced the making of parts of watches, having then about 35 operatives in the employ of the company. Nothing occurred that requires special note until the spring of 1862, or three years after the company had started. At this time the funds were exhausted, \$53,000 having been expended. A call issued to the stockholders for more was not responded to, and the war just coming on so stagnated business that the outlook was far from bright for the young company. Then, just here, another difficulty arose which, for the time, seemed insurmountable. The escapement was imperfect in construction, which prevented satisfactory results being obtained from the movements, and consequently no movements had yet been put on the market and no funds could be raised by their sale. One of those who was prominently identified with the project, in speaking of the movements, said: "They were nice in appearance but were like a body without

a soul" Mr. Stratton, as superintendent, thought the best thing to do was to dispose of the plant to the American Watch Company if possible, and with this end in view he visited Boston early in the spring of 1862 and had a conference with Mr. R. E. Robbins, which resulted in his placing the matter before the directors of that company, and the subsequent purchase of the Nashua plant by them for \$53,000, the whole amount which had been expended up to that date. Before the purchase was consummated, however, Mr. Robbins went to Nashua, taking with him Messrs. A. Webster, W. B. Learned and others to inspect the plant. Soon after the sale was effected, Mr. Chas. W. Fogg was sent from Waltham to take charge of the plant until a building should be erected at Waltham for the reception of it, which the company intended to keep separate from the other factory. It was known at Waltham for many years afterwards as the Nashua department. Upon his arrival at Nashua, Mr. Fogg proceeded at once to correct the escapement by having new pallets made with different angles, and to alter the impulse face of the escape wheel teeth. By this means the movements, to the number of about 1,000, which the Nashua Company had made, were put on the market. Not, however, as a Nashua, but as a Waltham movement, as new top plates were made and engraved Appleton, Tracy & Co. They ran the factory in Nashua until the building was completed at Waltham in the fall of 1862, when they moved, and the foremen and operatives mostly found employment with the Waltham Company.

Probably considering the size of the concern and the length of time it existed as a corporation; they made as good a record as any company yet started, especially with reference to some of the machinery, upon which Mr. Mosely and others made improvements that have never been superseded. They also introduced labor saving methods that are still in use. But for the want of adequate funds, they, like many others, were obliged to give way to the pressure of adverse circumstances.

(To be Continued.)

Obituary.

WILLIAM S. HEDGES.

Announcement was made in the daily papers of the death of William S. Hedges, which occurred on the 8th of December at his residence in this city. The event was not anticipated, although he had been sick and a great sufferer for some time. Mr. Hedges was well known to the jewelry trade in this country and also in Europe, as the senior partner in the firm of Wm. S. Hedges & Co., importers and dealers in diamonds and other precious stones. He was born in this city in 1834, and was, consequently, only in middle age at the time of his death. While still a very young man he became identified with the old firm of Smith, Young & Co., and from that time to the present his name has been connected with the jewelry business in a most prominent manner. With the changes that naturally occur in all business associations, the firm names with which Mr. Hedges was identified have been varied, but during the past eight years he has been known as the active head of the present house that bears his name. His brother, James Hedges, was his partner, and is now the surviving member of the firm. The deceased was noted for his ability and enterprise in his line of business, and also for his unimpeachable integrity. His manners were courteous and pleasant at all times, and he possessed social qualities of the highest order that endeared him to hosts of friends. He possessed a refined and gentle nature, and was actuated in all his affairs by the highest Christian principles. His death inflicts a severe loss upon the jewelry trade, and the sympathy of all goes out spontaneously to his stricken relatives. Mr. Hedges had been a great sufferer from a complication of diseases, and the certificate of death says that it was caused

remotely by eczema, catarrh and locomoto ataxia, and that the immediate cause of death was paralysis of the heart.

A large number of letters of condolence from social friends and business acquaintances were sent to the relatives, but we have room only for the following: A friend who knew him intimately writes to Mr. James Hedges as follows: "Please accept for yourself and household my sincere sympathy and condolence in the death of your brother. I knew him well and esteemed him highly. He was a true man, faithful, generous and just to all, and in all things. Knowing how you were all attached to him I can appreciate, at least in some measure, your deep grief. It is my hope that I can attend the funeral. May God bless you all."

Mr. Hedges was a valued member of Washington Lodge, No. 33, F. & A. M., of Elizabeth, N. J. The Secretary has written the following letter to his brother:

Washington Lodge, No. 33, F. & A. M.

ELIZABETH, N. J., Dec. 12, 1886.

BRO. JAMES HEDGES:

My Dear Friend—I was very much shocked to read in Thursday's *Tribune* a notice of the death of your beloved brother, William. I know, from what you told me only a little while ago, that he was very sick, yet I hoped it would have been right for him to get well, but our Heavenly Father knew best.

I never feel sorry for the person who dies, for, in almost every instance, death brings a blessed relief from suffering and the weary body finds rest, but I do sympathize with those who are bereaved, and to you, my brother, whom I have known so long and so well, I offer you my deepest sympathy and warmest love.

Sincerely yours, J. F. BUZBY.

The following was enclosed.

Washington Lodge, No. 33, F. & A. M.

ELIZABETH, Dec. 10, 1886.

BRO. JAMES HEDGES:

At a regular communication of Washington Lodge, held this evening, the following resolution was unanimously adopted:

Whereas, It has seemed good to our Allwise Heavenly Father to call from labor to reward our beloved brother, William S. Hedges, and in whose demise Washington Lodge has lost one of its noblest sons and the fraternity at large one of its tried, true and trusty craftsmen; therefore, be it

Resolved, That a page in our minutes be set apart to his memory, and a copy of this preamble and resolution be forwarded by the Secretary, under seal of the Lodge, to Bro. James Hedges.

Yours in the bonds of sympathy,
J. E. BUZBY, *Secretary*.

H. S. SPRAGUE, NEWARK, OHIO.

The Columbus *Journal* announces the death at Newark, Ohio, Nov. 25, of H. S. Sprague, in the 86th year of his age. He retired the night before in his accustomed health, but in the morning an unusual noise was heard in his room, and when his daughter hurried thither he was found to be dying. He survived but a short time after being discovered. Mr. Sprague was born in New York State, but had been engaged in business in Newark, Ohio, since 1829. He was one of the most respected, as also one of the most substantial business men of that place, and enjoyed the confidence and warm regard of all classes. Mr. Sprague was well known to the jewelry trade, and all who had dealings with him speak of him in the highest terms.

GIDEON M. HORTON, ATTLEBORO.

Mr. Gideon M. Horton, of Attleboro, died in Texas on December 16, of pneumonia. Mr. Horton was the founder of the firm of Horton, Angell & Co., of Attleboro, the other members being E. J. Horton and B. J. Angell. The senior member lost his life at the burning of the steamer Narragansett, and Mr. Angell was recently killed by being thrown from a carriage. Some three years ago Mr.

G. M. Horton was afflicted with a lung trouble and had been in the habit of spending the winters in the warmer climate of Texas, where he owned an extensive cattle ranch. On the first of December he started for the South, accompanied by Mr. F. A. Newell and Dr. Mackie, his family physician. At St. Louis they encountered very severe weather, from which Mr. Horton suffered greatly, catching a sudden cold which threatened pneumonia. The party proceeded on their journey, and on arriving in Texas Mr. Horton seemed so much better that Dr. Mackie returned home. A few days later a telegram announced the death of Mr. Horton, but this was contradicted, only to be followed a short time after with the positive announcement that he was dead. The deceased was an active, energetic and thoroughly capable man, a good citizen, public spirited, giving liberally to all charities, and was beloved by all who knew him. His death will be sincerely mourned in the community where he spent his life and where he filled so prominent a position. He was a widower, but leaves two daughters.

The Jewelers' League.

President, HENRY HAYES.....Of Wheeler, Parsons & Hayes.
First Vice-President, WM. C. KIMBALL.....Of Strange & Bro.
Second Vice-President, AUG. KURTZBORN.....Of L. Bauman Jewelry Co. St. Louis, Mo.
Third Vice-President, ROBERT A. JOHNSON.....Of Colby & Johnson.
Fourth Vice-President, JAMES P. SNOW.....Of G. & S. Owen & Co.
Secretary and Treasurer, WILLIAM L. SEXTON.....Of Sexton & Washburn.

EXECUTIVE COMMITTEE.

GEORGE R. HOWE, *Chairman*.....Of Carter, Sloan & Co.
JOSEPH B. BOWDEN.....Of J. B. Bowden & Co.
CHARLES G. LEWIS.....Of Randel, Baremore & Billings.
E. S. SMITH.....Of Smith & Knapp.
WM. BARDEL.....Of Heller & Bardel.
J. R. GREASON.....Of J. R. Greason & Co.

THE JEWELERS' CIRCULAR is the *exclusive* official paper of the Jewelers' League, and has been selected for the publication of all matters of interest pertaining thereto. Letters or inquiries pertinent to its business or purposes, and which might interest the trade or inquirers, will herein be answered. Address *Jewelers' League, Box 3,444, P. O., New York*, or the office of THE CIRCULAR.

At the regular meeting of the Executive Committee held on Friday, December 3, there were present the Chairman, Geo. R. Howe, President Hayes, Vice-Presidents Snow, Johnson and Kimball, and Messrs. Bowden, Lewis, Greason and Sexton.

Four (4) requests for change of beneficiary were granted.

Five (5) applications for membership were rejected.

The following ten (10) were accepted as members: William Arthur, East Orange, N. J.; Edwin M. Crellin, Chillicothe, Mo.; Geo. D. Cross, Chester, Pa.; Chas. B. Gray, Cortland, N. Y.; Louis F. E. Hummel, Cincinnati, Ohio; Geo. A. Preissig, New Orleans, La.; Eugene Robitaille, Lowell, Mass.; Robt. T. Thurber, Auburn, R. I.; Elias Weinmann, Philadelphia, Pa.; John E. Wilson, Washington, D. C.

Complimentary resolutions were passed on behalf of the Jewelers' Weekly Publishing Company for the Christmas number of the *Weekly*, which contains a full history of the Jewelers' League.

The propositions for amendments to the Constitution were being considered at midnight, when the meeting adjourned until Friday, December 10.

At the meeting on the evening of Dec. 10, the discussion of the proposed amendments to the Constitution and By-Laws was continued, and the closest consideration given to the changes thus suggested. Many of the proposed amendments were more of a verbal nature than anything else, not materially affecting the wording of the section amended, while others of them are of great importance. The most important is an amendment offered to Section 2 of the Constitution, whereby it is proposed to create a class who shall pay only half dues and assessments and be entitled to only half benefits, it being claimed that there are many persons who would like to be

members but cannot afford to pay full rates, and will be content with half benefits. Another amendment provides that full rate members may become half rate members without paying additional dues and fees and without re examination, but may accept half benefits for half assessments. An amendment proposed to Section 3 of Article 5 of the Constitution provides:

All members admitted prior to Jan. 19, 1886, shall be assessed \$2.00 for each death of a full benefit member, and \$2.00 for each two deaths of half benefit members; all full benefit members admitted subsequent to Jan. 19, 1886, shall be assessed according to the following table (according to their ages at the time of becoming members, reckoning to the nearest birthday—for the death of each full benefit member—and the same amount for two deaths of half benefit members):

| | |
|---|--------|
| Those aged from 21 to 30 years, both inclusive..... | \$2.00 |
| “ “ “ 31 to 35 “ “ | 2.50 |
| “ “ “ 36 to 40 “ “ | 3.00 |
| “ “ “ 41 to 45 “ “ | 4.00 |

Several amendments are offered to Section 1 of Article 6, relating to the manner of making assessments, and as these are of vital importance to all members we give them entire.

Article V., Section 4, (New), as follows: “Any member who shall not pay the annual dues provided for in Article XII., Section 4, within 30 days after the ordering of assessments next following these dates, viz., January 1st, April 1st, July 1st and October 1st, of each and every year, shall be stricken from the roll, in the same manner and under the same provision as in Section 2 of this Article.”

Article V., Section 5. (New). All half benefit members shall pay one-half of the assessments or other dues required from full benefit members.

Article VI., Section 1. The amount arising from the payment, by each admitted member, of his first assessment, together with the assessment ordered by the Executive Committee upon each other member, shall be placed in a Trust Company as a special deposit. Upon satisfactory proof of the death of any member of the League, the Committee shall pay this amount so collected (less the commission of the Secretary and Treasurer), not exceeding two dollars for each full benefit member, and one dollar for each half benefit member, and in no case exceeding five thousand dollars for full benefit and twenty-five hundred dollars for half benefit members.

The last two sentences of Article VI., Section 1, to be replaced by the following: After having ordered the payment of one or more death losses, the Executive Committee may, if necessary, order one or more assessments on each member, to be used in like manner. Whenever the balance in this special deposit over and above the amount of approved and unpaid death claims, exceeds the sum of ten thousand dollars, the surplus shall be transferred to the Contingent Fund. Whenever the Executive Committee deem it wise, they may use the balance of the Death Fund in their hands in part payment of current death claims.

Amendment to Article VI., Section 1: Strike out everything after the word member, on fourth line from top, and insert: And such other assessment, as may hereinafter be specified, shall be placed in a Trust Company as a special deposit. Upon satisfactory proof of the death of any member of the League, the Committee shall pay this amount, so collected (less five per cent.), not exceeding five thousand dollars; and, upon satisfactory proof of the death of a lapsed member of the League, the Committee shall pay one-fifth of this amount (less five per cent.), not exceeding one thousand dollars, to the person or persons whose names shall, at the time of the death of such member, or lapsed member, be found recorded as his last designated beneficiaries, or, in the case of their death, to their legal representatives; and the receipt of the proper party in either case shall be conclusive and final, except when such member or lapsed member shall have, in his last will and testament, left the amount to other parties than the ones designated on the books of the League, and legal notice of the probate of such will shall have been served upon the Secretary of the League before the payment of the loss shall have been made. Immediately after having ordered the payment of a death loss for a member, the Executive Committee shall order another assessment upon each member, to be used in like manner; and after the payment of a death loss for a lapsed member, the Executive Committee shall order another assessment of fifty cents upon each member, to be used in like manner. Whenever the amount in this special deposit exceeds the sum of six thousand dollars, the excess shall be transferred to the Contingent Fund.

An amendment looking to the increase of the Contingent Fund reads as follows:

Insert: Article XII., Section 4. “The Contingent Fund shall be increased by imposing on and collecting from each and every full benefit member of the League an annual due of four dollars, and from each and every half benefit member an annual due of two dollars, payable quarterly in advance.”

The following propositions for continuing lapsed members for a period of six months is in line with the non-forfeiture feature of regular life insurance policies as required by law:

CONSTITUTION. Amendments to Article V., Section 2: Strike out all after the word membership, second word, fifth line from the bottom. Insert:

Section 3. But any person who has been a member in good standing for two years or more, and fails (for the first time) to pay an assessment, shall have his name carried on the books of the League as a lapsed member for six months from the date of the closing of such assessment, and should he die during such six months, his beneficiary or beneficiaries shall be entitled to one-fifth of the death benefit, which shall in no case exceed one thousand dollars; and special provision shall be made for the payment of this extra benefit, as hereinafter provided for.

Section 4. At the expiration of the six months, and not until then, a person who has thus lost his membership may again become a full member, upon payment of all dues and accrued assessments, subject, however, to the approval of the Executive Committee.

Section 5. No person who has not been a member of the League for at least two years, and no member who resigns from the League, shall enjoy the benefits conferred by Sections 3 and 4, excepting that they may again become members upon payment of all dues, subject, however, to the approval of the Executive Committee.

Section 6. A member can only avail himself once of the benefits conferred by Sections 3 and 4; after having been a lapsed member, should he again fail to pay an assessment within the proper time, his name shall be stricken from the roll. However, such a person may again become a member, as provided for in Section 5.

The above, and all other proposed amendments will be submitted to the annual meeting for adoption or rejection. As they contemplate some radical changes in the methods and practices of the League, it will be seen how important it is that every member should be present to vote on them.

The annual meeting of the full membership of the League will be held at Cooper Institute, second floor, on the evening of Tuesday, January 18, when it is hoped that every member who can possibly do so will be present. There are to be elected on that occasion a President for one year, third and fourth Vice-Presidents for two years, Secretary and Treasurer for one year, and three members of the Executive Committee for two years each. Special attention is called to the change in the place of holding the meeting, from Masonic Temple to Cooper Institute, large hall, second floor.

The Engraving of Gems.



THE ART of engraving gems is very old. Due to the extraordinary hardness and durability of these small works of art, thousands of years have passed by and left them unscathed, and they have been transmitted to us, materially aiding the student in his researches of the mythological and heroic ages. Chinese engravings represent characters which the present generation no longer understands, and thereby they become monuments of a prehistoric civilization. Egyptians, Babylonians, Greeks, Romans—in fact all ancient nations with whom we are acquainted—have, from the earliest time up to their decay, left to us a record of their rise and fall by means of these gems. Moses specifies what class of engraved gems the vestments of the high priests shall bear. Herodotus is the first author who mentions the name of an engraver of gems (Theodorus). Later engravers—for instance, Pyrgoteles, the favorite of Alexander the Great, Dioskurides, living in the time of Augustus, and several others—are better known. But it was not alone self-vanity that prompted the wearing of these engrossed stones as articles of personal adornment, nor the love of art to possess them, that caused them to be produced; it was rather the superstition that engraved stones

possessed eminent secret virtues. They were worn as protectors against sickness, as intercessors with Deity, etc.—a superstition which was transplanted even into early Christendom and combatted by the early bishops of the church. The art of gem engraving fell into complete decay with the fall of the Roman Empire, and continued to be practiced only in Byzantium until this city was taken by the Turks, when several of the gem engravers living there took refuge in Italy and transplanted the art to its shores, where, under the protection of several art-loving Popes and the Medicis, it soon began to flourish.

To the most excellent masterpieces of this kind belong the works of the Pichlers, senior and junior, a family which, in the eighteenth century, emigrated from Tyrol and settled in Italy. Joseph II. ennobled the son and his bust was placed in the Pantheon. King Frederic William III., of Prussia, endeavored to introduce the art in his kingdom. He caused a gem engraver, Calandrelli, of Rome—to settle in Berlin and to teach scholars, but the king remained to be the sole promoter and the scheme met with no favor by the people. Calandrelli profited by the ignorance of the people, and through agents sold his products to the Royal Museum of Berlin as specimens of antique Greek engraving. It was no wonder, therefore, that the few scholars taught by him either left the art altogether, turned engraving into a trade vocation or settled in foreign countries; and, beside the engraving of a seal or a coat of arms, little in this line is at present done in Prussia.

Much greater success than Calandrelli had at Berlin was met by another Italian in Paris, who settled here in the beginning of this century. He found very ready assistance in all circles, and a respectable number of scholars soon gathered around him. Under the reign of Napoleon III. there were several ateliers with from ninety to one hundred and twenty engravers, and, in all, there were several thousand artists working in this art branch in Paris, which had become the world's mart for these productions, while the export amounted to several millions of francs annually. The Ecole des Beaux Arts yearly turns out a respectable number of "medailleurs" and gem engravers, who receive their artistic training under the same conditions as painters and sculptors, and the *salon* every year exhibits a number of engravings of a rare artistic merit.

Germany also has two places where this art supports from three to four hundred followers. We speak of Idar and Oberstein, which, beside this, contain the largest jewel cutting establishments in the world. These artists are complete dependents upon Paris as the only market where they can dispose of their products, and for this reason they were compelled to obey the mandate of their Parisian customers not to expose their goods at Melbourne. It is rather singular that, although the Germans are the masters of the art, both at home and in Paris, a German, "Pichler," executed the best works in Italy, that many Germans in Paris have executed the best masterpieces there, and their works fill the *salon*. Nevertheless, the art is looked on as eminently French, and the productions of the Germans go into the world as French.

Together with many other erroneous beliefs, there is one which holds that if a gem engraver of the present day has only approached the productions of antiquity he is a master of his art. This is altogether untrue. There are only a few of the best Greek engravings, especially the larger portraits, heads, busts, etc., that may be called artistic. Technically considered, modern works are higher finished, because only the invention and use of the magnifying glass made the correct finishing, especially that of the smallest and most delicate pieces possible. Not one of the many antique gems contained in the European museums shows in its minor details the pronounced expression and correct finish of the modern gem cut since the seventeenth century. The ill success of Calandrelli, which is not sole of its kind in history, conclusively proves that there is a superabundance of false beliefs even in scientific circles, and that their so-called expert judgment is frequently influenced by prejudice; work is often pronounced to be bad because it is modern, and surpassingly beautiful because deemed to be antique.

Many antique engravings are known to us only through glass pastes. They are produced by running melted glass, of the color of a gem, over the plaster of paris impression of a gem. When cold, the glass is retouched and reduced into the shape of the original. These duplicates assume pretty sharp contours, and, if carefully done, they can barely be distinguished from real engraved gems; many frauds have been perpetrated with them; glass plates of barely any value have frequently been sold as genuine gems.

The student will sometimes see in scientific books that the ancients also engraved on glass. This is another erroneous belief, and got up at first, perhaps, for the purposes of fraud and deception. No artist will make use of glass for artistic purposes of this nature; first, because it is cut with greater difficulty than a gem and therefore would require a longer time; and, second, it cannot be used for sealing, because it heats at once and remains sticking to the wax.

Manner of Extracting Silver from Ores in Mines of Mexico.



IN CEDRAL, State of San Luis Potosi, are situated a number of *haciendas* (works) for extracting silver from the ores taken out of the mines, situated at the Real of Catorce, 24 miles distant, amongst the mountains, 7,441 feet above the level of the sea. The crude mineral is brought down from the mountains to Cedral on the backs of mules, in *zurrones* (bags) made of untamed beef hides, each mule carrying 300 pounds, or a *carga*, 150 pounds on each side. These ores, on account of the scarcity of water, cannot be "benefitted" in Catorce; they are therefore brought to Cedral where there is a sufficient supply. In the neighborhood of all the mines in Mexico there are *haciendas de beneficio*, or works for extracting the silver from the ore, but as the process is the same in all it is sufficient to describe one. The building in Cedral is 300 feet long, made of adobe, and back of it, forming a square of the same length and width, is a court-yard. In front there is a large doorway for entrance, where nobody is allowed to enter without previous permission. The *hacienda* is directed by an administrator, who has his officials and clerks and directs the establishment. The peons or workmen gain from 75 cents to \$1 a day, and are paid off at the end of each week.

The ore as it is brought from the mine is in large pieces; this is piled up in the court-yard in a huge pile, and does not look as if it contained any mineral, but like so much red stone. It is, in the first place, put into an enclosed box and pounded to pieces by immense wooden pounders, armed on the end by iron pestles, which are lifted up by arms connected with an axle which is turned by mules. The ends of these arms fit into a notch in the pestles and lift them up a certain distance, and then the end of the arm slips out of the notch and the iron pestle falls down with an immense force upon the mineral and comminutes it into small pieces. These fall down upon a sieve made of hide, and the smaller pieces fall down through the holes in the sieve and the larger pieces are thrown back under the pestles to be again crushed. There are several of these pestles in a straight line, connected with the same axle, and they are lifted up alternately.

After the ore is pounded to pieces in the mortars (*morteras*) it passes to the *tahones* or mills, which consist of a round vat, placed on a level with the floor, where the metal is ground up into a fine mud (water being added), by means of three heavy and hard granite stones of an oblong shape which are tied to the arms, connected with a revolving axle turned by a mule which walks around in a circle blindfolded. Into holes made in the stones, sticks are introduced, and these are connected by means of ropes or chains to the revolving arms. There are several of these circular vats all situated in a line in a long room, each worked by a mule blindfolded. These are called *tahones*, and the crest-pole in the middle, *peon*, with its two *brazos* (arms) of wood, from which are suspended the heavy stones called *metapiles* or crushers.

From here the ore, looking like so much mud, is thrown out into

the *patio* or yard, which has a floor well made of some hard cement or stone, and here are added quicksilver and salt in a liquid state, or *caldo* (soup) as it is called. It is thus left in the open air exposed to the heat of the sun some twenty or thirty days, and is stirred up every day or two by the feet of men and horses, who walk around in a circle until the quicksilver and salt are well incorporated with the ore. When this process is completed the mud thus mixed is called *torta de lama* (cake of mud). After the ore is thus worked or brought to a proper state it goes to the *lavadero* (washing place), called *tina* (vat), which is round and made of wood and stone, where the silver is separated from the earth, and here is where the *tortas de lama* (piles of mud) are taken from the yard, and here remains after the mud is washed out what is called the *plata fina* (amalgamated silver), containing quicksilver; this amalgam is then put into stout canvas bags and submitted to a heavy pressure to get rid of the mercury, and afterwards it goes to the furnace where the silver is purified of all foreign substances.

There is an additional process which is pursued with certain kinds of ores. After the mineral has been exposed to the sun in the *patio* or yard, it is transferred to the *planillo*, which is an inclined plane in the open air, having a solid stone floor some 60 feet long and 20 feet wide. At the foot of this sit a number of nearly naked men, who occupy themselves by throwing water gradually on the mass of mud by means of pieces of ox horn, so that the mud flows off and runs outside of the yard in a ditch, and the silver with some mud is left at the foot of the inclined plane. This requires a great deal of skill as the water must be thrown on gradually. After this process, the greater part of the mud has flowed off and only a small portion remains which contains the silver. This mud is then removed to a room in the second story where it is placed in the *criso*, a large round iron boiler, with fire underneath; water is added and it is stirred up by means of revolving arms worked by a mule, and the remaining mud flows off, only a small portion remaining. The rest of the process consists in removing the remaining substance to the amalgamating room where quicksilver is added, which unites with the silver in the mud, and then this is further washed and only the quicksilver is left united with the silver. This is further purified in a furnace and the silver runs off into molds, and is then sent to the mint at San Luis Potosi to be coined.

There are different kinds of ore: one which is merely exposed to the fire of a furnace, and this is called *fundicion* (fusion), and another of the *patio*, or yard; the latter is put through the process here described. One kind of ore goes to the *patio* and from there to the *lavadero*, and another goes to the *planillo* and from there to the *criso*. The white and green silvers are put through the process of the *patio* and the *criso*; the *bronces* (bronzes), *plomeros* (containing lead), and those mixed with other minerals are extracted by the *patio* and the furnace.

The processes used for extracting the silver are very crude. No one thinks when he has handled a silver dollar how much trouble it has cost to make it. From three hundred pounds of crude metal only three to eight ounces are extracted. Some of the richer ores, after being ground up, are mixed as before with mercury and salt, and then made into *tortas*, or piles, some six feet in diameter, and an Indian, bare-legged, commences in the middle and walks around regularly, placing one foot before the other, by a peculiar movement, and leaves not a single particle unstamped and keeps this up all day. The object of this is to unite the crude mercury with the silver. These men are paid three bits a day, 37½ cents.

There are three different principal kind of silver ore extracted from the mines, according to the kind of metal with which they are combined, although there are other varieties. For example, we have *plata blanca*, or white silver, which is the purest and the rarest. In this variety the silver can be seen resting on the surface of the stone. *Plata verde* (green silver); this is also a rich variety. The silver is here united with copper, and the veins of blue and green in the ore are the silver with the copper. *Las bronces* contain silver, but in a less quantity, united with iron, which looks like brass or gold and would deceive an ignorant person. *Plomosos*, where the silver is united with lead, is scarce and almost unknown in Cedral, but is the most common at other mines situated in Nuevo Leon, such as Ballecilla, Cerralvo, Villadama, etc. All the different kinds of silver are called *azogues*, or quicksilvers, referring, probably, to the amount of quicksilver necessary to extract the silver from each. There are also *caliches*, or chalks, which are rich in silver and are the most common

here, although the earth looks like common white limestone. Most of the mines have *haciendas de beneficio* (extracting works) for extracting the silver, situated at some distance from the mines.

When the products of the mines are rich money is plenty, as the workmen get a certain share of the ore they get out, but when the veins give out everybody becomes poor and the men go elsewhere to work.

At the Maroma, 24 miles from Catorce, amongst the mountains, water power is used for grinding the ore. The mill consists of a solid wall of masonry, forming a channel through which flows a stream of water. Inside of this channel there is a wheel placed horizontally, which has a number of flat boards shaped like spoons fastened around it outside to catch the water. This wheel is connected to a perpendicular pole by four arms. Inside of the wheel there is a round inclosure of masonry in which the ore is ground by means of the *metapiles*, or crushers. These, as before mentioned, are huge, heavy stones, made of granite, somewhat oblong in form, and into each of these a hole is bored and a stick introduced, and this is fastened by a chain to arms connected to the perpendicular pole. The pole, being connected with the wheel by arms, turns in a socket at its bottom and thus turns also the *metapiles*, which are also connected with it by other arms. These are the most primitive mills known, and are probably as old as the times of Columbus, but they do their work very well and at least dispense with mule power.

Turquoises and Their Value.



TURQUOISES are found in Thibet, China and the neighborhood of Mount Sinai, but the supply for jewelers' purposes comes almost wholly from the celebrated Persian mines. Very little was known about these till a remarkably interesting and exhaustive report upon them was recently furnished to the British Foreign Office by Mr. A. Hontum Schindler, who was, for a short time, director of the mines. They are situated in a range of mountains bounding on the north an open plain in the Bar-i-Madèn district, 32 miles northwest of Nishapur, in the Province of Khorassan. Botanists tell us that the brightest blue is seen on alpine flowers. If pure mountain air could be supposed to brighten the color of a gem as well as a flower, there is no want of it where these turquoise veins occur. Their position is between 5,000 and 6,000 feet above the level of the sea, and a strong north wind blows almost continually over the ridges of the hills, rendering the situation very healthy. Wheat, barley and mulberry trees grow well on the slopes at the lower of these heights. * * * At the mines the turquoises are roughly divided into three classes of first, second and third qualities. All the stones of good and fast color and favorable shape belong to the first class. But how curiously these vary in value will be best understood by quoting Mr Schindler's own words: "It is impossible to fix any price or classify them according to different qualities. I have not yet seen two stones alike. A stone two-thirds of an inch in length, two-fifths of an inch in width and about half an inch in thickness cut *peikani* (conical) shape, was valued at Meshed at £300; another, of about the same size, shape and cut, was valued at only £80. Turquoises of the size of a pea are sometimes sold for £8. The color most prized is the deep blue of the sky. A small speck of a lighter color, which only connoisseurs can distinguish, or an almost unappreciable tinge of green decreases the value considerably. Then there is that undefinable property of a good turquoise, the *zat*, something like the 'water' of a diamond or the luster of a pearl; a fine colored turquoise without the *zat* is not worth much." He subsequently adds: "The above mentioned three hundred pound Meshed turquoise was bought from the finder by one of the Rish-i-Safids (elders of the village) for £3; the latter sold it, still uncut, at Meshed for £38. As soon as it was cut its true value became apparent, and it was sent to Paris where it was valued at £600. The second purchaser, however, received only £340 for it; the difference was gained by the agents." Among the fine turquoises in the possession of the Shah there is one valued at £2,000. The best stones of the second class are worth about £90 per pound, while the most inferior will scarcely bring a twentieth part of this price. The latter are chiefly used in Persia for the decoration of swords, horse-trappings, pipe-heads and the common kinds of jewelry. Small cut turquoises of a slightly better quality than these sell at the rate of from 2s. to 3s. per 1,000. In the third class are included stones unsalable in Persia, as well as large flat stones, some of which are esteemed for amulets, brooches, buckles and the like. The prices given there will be more than doubled when the turquoises are sold in Europe.—*Chamber's Journal*.

Foreign Gossip.

ANTEDILUVIAN.—A giant oak weighing about 55 tons has been recovered from the bed of the Rhine, where it is supposed to have lain at least 3,000 years, and is on exhibition on a kind of Noah's Ark off the Cours-la-Reine, Paris.

IMPORTS OF GOLD.—Since the tide turned, the imports of gold to this country are estimated at \$7,000,000, and have had their effects upon the markets. Silver has taken a very sharp upward turn in London, rising lately about ten per cent.

STRENGTH OF A LION.—It has been shown that the strength of the lion in the fore limbs is only 69.9 per cent. of that of the tiger, and the strength of the hind limbs only 65.9 per cent. Five men can easily hold down a lion, but nine men are required to control a tiger.

LUBRICATING SCREWS.—According to a French industrial paper, a mixture of oil and graphite will effectually prevent screws becoming fixed, and moreover protect them for years against rust. The mixture facilitates tightening up, is an excellent lubricant, and reduces the friction of the screw in its socket.

BOYCOTTED BY SAVAGES.—The natives of the west coast of Africa have hit upon a highly civilized way of dealing with the Germans and Frenchmen who have appropriated their lands. At Cameroon and Bonny decrees of non-intercourse with the whites have been passed. They refuse to work for or trade with their objectionable neighbors.

NEW SILVERING PROCESS.—An ingenious process for giving a silver surface to iron has recently been devised in Austria. The iron is first covered with mercury, and silver is deposited upon this surface electrolytically. The iron is then heated to about 300° C., and the mercury evaporates, leaving the layer of silver upon the surface of the iron.

GLETSCHERS.—The number of glaciers of the Alps is 1,155, according to Professor Heim. Of these, France has 144, Italy, 78; Switzerland, 471; and Austria, 462. Their total superficial area is between 500 and 1,000 square miles. The longest is the Aietach Glacier in Austria, measuring over 9 miles, and 249 have a greater length than 4½ miles.

NEW COMPANY FOR DREDGING.—A company has been formed to dredge the Carson river, in Nevada, for quicksilver and amalgam. Eighteen miles of the river bed have been located. It is estimated that ten per cent. of the bullion product of the Comstock mines have flowed as "tailings" into the Carson river, and that at least \$40,000,000 will be discovered.

CURE FOR SOMNOLENCE.—A mechanically inclined Frenchman has had constructed a bed which wakes him up at the desired hour by means of a chimes of bells, then lights a candle, pulls off his night cap and starts up a self-acting coffee pot. If the sleepy Frenchman don't get up by time coffee is ready, the bed rises bodily on end and deposits its lazy occupant upon the floor.

CHEMISTRY OF NATURE.—In Algeria there is a small stream which the chemistry of nature has turned into true ink. It is formed by the union of two rivulets, one of which is very strongly impregnated with iron, while the other meandering through a flat marsh, imbibes gallic acid. Letters have been written with this compound of iron and gallic acid, which unite to form the little river.

CURIOUS RESULTS.—A curious result of the volcanic eruption in New Zealand is alleged to have been found in the sudden breaking up of the drought in Australia. It is said that the Java earthquake of 1883 was the immediate forerunner of a long spell of dry weather in Queensland in that year, and that a welcome fall of rain in the same colony followed immediately upon the eruption of Mount Tarawera.

A PORTABLE ELECTRIC GLOW LAMP.—M. Gaston Trouvé is said to have constructed a portable electric glow lamp for use where there is explosive atmosphere. This lamp is intended to be of service in mines, celluloid factories, flour mills, spinning mills, etc. It is automatic in action, and is stated to be very simple in construction. There are two varieties of the lamp made, one which will only light itself when taken up in the hand, the other, when it is hung up or put down. The current is produced by a battery contained in the lamp.

HISTORY OF STEEL PENS.—It is not exactly known when or by whom the steel pen was discovered. The Birmingham *Post* says that bronze pens occur as early as the 13th and 14th-centuries, and, it is asserted, that a real split metallic pen, no stylus, belonging to the time of the Romans, has been found at Aosta. In the 16th century metallic pens were manufactured in Birmingham as articles of luxury; greater numbers were made in 1817, but only in 1823 and 1824 began their wholesale manufacture by the assistance of appropriate machinery, which rendered their manufacture more easy. To John Mitchell, an Englishman, belongs the honor of having been the originator of the manufacture of steel pens.

YELLOW FEVER.—Dr. Freire, who claims to have discovered the microbe of the disease (yellow fever) and a method of inoculation to prevent its ravages, is reported to have performed the operation upon 7,000 persons, living in localities where yellow fever is prevailing in a most malignant form. Of this large number but eight have died. During the same period some 3,000 uninoculated persons have succumbed to the fever. Should the bill to enforce inoculation in Brazil obtain a place in the statutes, these claims of Freire will be subjected to rigid investigation by the best American experts, and, if substantiated, will doubtless be the means of introducing his system, or a modification of it into the United States whenever yellow fever shall again appear in epidemic form.

CORK STONE.—A material, called cork stone, is extensively used for building purposes in Germany and Belgium. Patents were secured for its manufacture in 1880. It is claimed for it that it is a non-conductor of heat, cold and sound. The base of this material consists of pieces of waste cork, such as, in many trades, are thrown out as unfit for use. These pieces, cut down to about the size of a pea, are mixed with the cement, consisting of mortar and clay, until each single particle is thoroughly coated with the cement, after which the mess is pressed into proper shapes and dried. From this manipulation results a porous body, resembling in appearance the so-called Rhenish alluvial stone, but of much less specific weight, that of the cork brick amounting at most to 0.30 or 0.35.

ASTRONOMICAL THEORIES.—According to the recent investigations of an eminent German astronomer on the nature and origin of the Aurora Borealis, the latter is not to be regarded as connected with any magnetic or electric source. The sun's rays, he says, falling on the earth, are variously reflected, according as they fall vertically or at an angle more or less obtuse, and, the earth being conceived as a large mirror, many of the obliquely incident rays will be reflected to a part of the celestial vault on the night side of the earth. The zodiacal light he ascribes to the irregular reflection of the sunlight from water, and similarly the vast fields of ice in the polar regions he considers may be regarded as an imperfect mirror, irregularly reflecting the incident light; the rays which fall most obliquely are the most abundantly reflected, and, as the quantity of reflected light increases with the angle of incidence, it may be seen how the reflected sunlight illuminates in the highest degree the night skies of the region nearest the pole—and, further, the great similarity of the incipient light of the Aurora is explained thus, the latter being the sunlight reflected, the rays falling on the ice at an angle of forty degrees are, however, dispersed as well as reflected. As to the idea that the point of origin of the Aurora is indicated by the direction of the magnetic needle, it is claimed, rather, that a line drawn from the sun at right angles to the horizon and prolonged, would be the middle line of the phenomenon.

Workshop Notes.

STAINS FROM MARBLE CASES.—To remove stains from marble cases, clock dials, etc., take equal parts of fresh oil of vitriol and lemon juice; shake up these substances very thoroughly in a bottle, wet the spot with the mixture, and in a few minutes afterward rub with a soft linen cloth and the spots will be found to have disappeared.

TO DRILL AND ORNAMENT GLASS.—Glass can be easily drilled with a steel drill, hardened but not drawn, and driven at a high velocity. Holes of any size, from the sixteenth of an inch upward, can be drilled by using spirits of turpentine as a drip; and easier still by using camphor with the turpentine. Do not press the glass very hard against the drill. If you desire to ornament glass by turning in a lathe, use a good mill file and the turpentine and camphor drip, and you will find it an easy matter to produce any shape you choose.

TO TEMPER DRILLS.—Select none but the finest and best steel for your drills. In making them, never heat them higher than a cherry red, and always hammer till nearly cold. Do all your hammering in one way, for if, after you have flattened out your piece, you attempt to hammer it back to a square or round you will ruin it. When your drill is in proper shape, heat it to a cherry red and thrust it into a piece of resin or into mercury. Some use a solution of cyanuret of potassium and rain water for tempering their drills, but the resin or mercury will give better results.

HARDENING.—The operation of increasing the hardness of steel is by heating it to redness and then cooling it suddenly. Bright steel should not be exposed naked to a fire or flame. It may, with advantage, be placed in a covered box containing bone dust or animal charcoal in some other form; or another plan is to smear soap all over the article to be hardened. Water or oil is the medium generally selected for plunging the article in to cool it. Petroleum is recommended if extra hardness is required. Either mercury or salt water will give great hardness, but the steel is rendered brittle. Oil is the best medium for hardening steel if toughness is desired.

CAUSES PRODUCTIVE OF STOPPAGE.—There are many causes that produce the stoppage of a watch—in fact, their name is legion. The following defects are less familiar to the repairer (and it is well if he sums up the entire list from time to time): Too small a barrel sink, especially if the barrel is not entirely true; scraping of the tooth rim upon the plate, at the foot of the click spring and at the center bridge; too broad or too narrow a barrel tooth or one with burr; a dust plate either too large or untrue, which thereby scrapes in the dust cap; or plate with too large a hole, which passes above the projecting center pivot, whereby this wheel would be cramped in; too small a sink of the minute wheel; cramping of this wheel upon its pivot (minute wheel pin); a canon pinion with burr; too small an hour canon.

GOOD CYLINDER PIVOTS.—Good cylinder pivots facilitate timing. To insure a sufficiently free motion of the cylinder, the pivots, with flat set stones, must have a 2 degree shake. Timing in vertical and horizontal positions is facilitated if the pivot ends are flattened in the burnishing tool; then simply round off the sharp edge produced thereby. In a horizontal position only the pivot ends experience friction, while in a vertical position both pivots rub with their entire lengths in the jewel holes. The difference of these two frictions is quite important, and great care must be bestowed on the jewels. They must unconditionally be replaced if they are cracked, rough, oblique or unduly thick, if anything like correct timing is to be produced. Unduly wide jewel holes also render timing difficult, and either they or the cylinder plugs must be replaced according to the quality of the one or the other. The best thickness of cylinder pivots in medium sized watches is 10° .

COMPOSITION FILES.—The watchmaker frequently uses composition files for grinding and polishing; when he lives in a town where material stores are at hand it is, perhaps, cheaper to buy them, but the country watchmaker may at times run short, and he has to make them himself from the following composition: Copper, 8 parts; tin, 2 parts; zinc, 1 part; lead, 1 part. They are cast in forms and sharpened upon the grindstone; the metal is very hard, and therefore worked with difficulty with a file.

TO MIX POLISHING MATERIAL.—Crocus should be thoroughly beaten upon glass or a polished steel stake, forming it into a stiff paste with very little oil. Far too much oil is generally used, and the mixture is made thinner than it should be. Olive or sweet oil is not suitable, and, if used, the polishing stuff becomes gummy in a few days. Refined sperm oil answers well. Diamantine should be mixed in the same way, as dry as possible, so that when it is used the polisher is only just dampened with it.

THE FUSEE CHAIN OF AN ENGLISH LEVER.—The fusee chain of an English lever will sometimes be found to work too stiff, and on close examination this will be found to be caused by rust. To correct this, place the chain in oil and leave it for several hours at least. Next round off the edge of a boxwood block, cut a groove across this ledge and fasten the block in a vise; then place the chain like a saddle in the groove so that it hangs down on either side. Apply plenty of oil to the wood, take an end of the chain in each hand and pull it backward and forward in the groove, renewing the supply of oil whenever necessary. This manipulation makes the chain thoroughly flexible, and it must be cleaned with benzine or soap and hot water. Rinse it thoroughly in water, and immerse it for a few minutes in alcohol. After having been dried dip it in fine oil, and dry in a clean linen rag free from fiber.

EXHAUSTED COLOR BATHS.—It is but reasonable to presume that the corroding bath used for coloring will, beside eating off the base metal used as alloy from the surface of the golden articles, also take off more or less gold, and, indeed, experience has established this as a fact. If the establishment of the goldsmith is not sufficiently large to warrant the setting up of tubs for saving wash water, etc., it is advisable to dissolve a handful of sulphate of iron (green copperas) in boiling water and add it to the exhausted coloring baths; it precipitates the small particles of gold. Then draw off the supernatant water, say, with a syphon, being very careful not to disturb the auriferous sediment at the bottom. Then proceed to wash the sediment with plenty of boiling water to remove any trace of acid; this will require three or four separate washings, allowing sufficient time between each to allow the water to cool and the sediment to settle before decanting the water. Then dry in an iron vessel by the fire and finally fuse in a covered crucible with a flux.

DEFECTIVE PLATING.—The question is often asked, especially by beginners in the art of electro-plating, "What is the cause of 'stripping' after replating metal spoons?" Presuming that the bath, preferably composed of the double cyanide of silver and potassium, is in good working order, he must pay attention to the mode of preparing articles previous to their immersion in the solution. Their surfaces must be chemically clean. First, by mechanical means, if necessary, then by dipping in a solution of caustic potash to remove grease and finger marks; rinse well in water, dip in weak solution of sulphuric acid, rinse again, then dip in a solution composed of one part common salt, twenty-five of nitric acid and one part of sulphuric acid. The final dipping is in the quickening solution, composed of one part nitrate of mercury in one hundred of water, clarified with a little sulphuric acid, the article to be finally washed in water. The quickening solution makes the article white; very little of this is required, as too much is the cause of stripping.

Trade Gossip.

Mr. L. J. Matthewson will represent the firm of T. J. Smith & Co. this year.

Mr. Solon Neff has removed from Honey Creek, Ind., to Brooksville, Florida.

In consequence of ill health, Mr. James W. Todd has retired from business.

Messrs. Oppenheimer Bros. & Veith are introducing a new line of gold decorated watch cases well worth the attention of the trade.

Mr. Thomas S. Tice, a well known Brooklyn jeweler, has been appointed an assistant appraiser in the New York Custom House.

Mr. D. C. Townsend, formerly with Peterson & Royce, has resigned and transferred his services to E. Aug. Neresheimer & Co.

Mr. E. Bacon has retired from the firm of A. Bushee & Co. Albert and C. A. Bushee will continue the business under the old firm name.

J. S. Birch & Co., manufacturers of the self-adjusting and adjustable watch key, have removed from 38 Dey street, to 182 and 184 Lewis street.

Giles, Bro. & Co. have opened an office at 18 John st., for the sale of their anti-magnetic watch cases. It is under the charge of Mr. Fayette S. Giles.

Mr. James Fricker, of Danville, Va., will have the sympathy of the trade in the bereavement he has recently sustained in the loss of his wife, Mrs. Fanny E. Fricker.

Alfred H. Smith & Co. have sent out a New Year greeting in the way of a finely engraved calendar. It is very neat in appearance, and will be highly appreciated.

Fowler Bros., the well known manufacturers of English crape stone jewelry, have this season added to their stock large lines of white stone and moonstone goods.

Bookout Bros., 38 Maiden lane, have won a deservedly high reputation as artistic wood engravers, and make a specialty of filling orders for the trade with promptness.

Mr. J. H. French, the well known jewelry auctioneer, is disposing at auction of the stock of Mr. S. P. Hamilton, of Savannah, Ga., who has decided to retire from business.

Mr. E. L. McDowell, of Arkansas City, sends his Christmas greetings to the trade, in the form of card, on which is printed a crescent, and a portrait of Mr. McDowell.

We acknowledge the receipt of a photograph of the interior of the new store of O. S. Clayton & Sons, of Aurora, Ills. It shows an elegant arrangement for the display of their large stock of desirable goods.

The American Institute has awarded to Mr. D. De Sola Mendes a medal of excellence for the exhibition of diamond cutting and polishing appliances and processes displayed by him at their recent exhibition.

W. G. Clark & Co. call attention in their advertisement this month to their improved short post adjustable sleeve buttons. They make a specialty of ladies' buttons, and give various illustrations of their latest designs.

We are indebted to Messrs. Moore & Schley for an elegant lithograph, representing the various stock, produce and other exchanges of the country. It is an artistic and beautiful print, which will be highly appreciated.

H. Muhr's Sons, of Philadelphia, have issued a New Year's greeting, in the form of a pocket memorandum of white celluloid, on the front of which is a steel plate engraving of their new factory, while on the back is a convenient calendar.

The firms of Pfaelzer Bros. & Co. and L. Pfaelzer & Co., of Philadelphia and New York, have consolidated, and will continue business at 819 and 821 Market street, Philadelphia. The New York house has been discontinued.

The American Waltham Watch Company has recently placed on the market, a 3-size lady's watch which creates the smallest regular size known to the trade. It is not only very handsome, but is an excellent timekeeper as well.

The firm of E. L. Anrich has changed to E. L. Anrich & Co., and removed their office to 24 Maiden Lane. They still continue as importers of rough and polished diamonds, having their factory at Maiden Lane and William st.

The Waltham Watch Tool Co. has purchased the patent and business of the Hopkins Watch Tool Company, and thereby becomes its lawful successor. The Waltham Company manufactures tools of all kinds for the use of jewelers.

Mr. J. G. Fuller, for many years the representative of the American Lever Button, has resigned from the service of Howard & Son. He has not yet made his arrangements for the future, although several offers have been made him.

Jewelry thieves have recently been raiding in Boston as well as other sections of the country. Among the victims were Benjamin Noyes, who lost goods valued at \$1,500 and a valuable oil painting that was destroyed, and Moses Webber, who was despoiled of \$300 worth of watches and jewelry.

An error occurred in the advertisement of R. & L. Friedlander in the issue of THE CIRCULAR for last month. Certain prices were given for their goods advertised without stating that there was a considerable discount from the figures given. Dealers desiring these goods should send for prices.

Mr. B. E. Daggett, representing the firm of B. E. Daggett & Co., of Providence, will call on the jobbing trade early in January, with an entirely new line of plated rings, made in an endless variety, and set with stones of all kinds. Mr. Daggett has engaged rooms at the Astor House for the coming season.

Messrs. Walter E. Hayward, son of the late Charles E. Hayward, and George L. Sweet, lately with S. W. Gould & Co., have formed a co-partnership, and will succeed to the business of C. E. Hayward & Co. The New York office of the old firm will be discontinued, and all their business transacted at Attleboro.

Mr. H. H. Heinrich, chronometer maker, of 14 John street, has inaugurated the new system of renting chronometers to the trade. No dealer need now be without a marine chronometer, as the price charged monthly is very small and will be deducted from the price in case the accommodation should result in a purchase.

After January 1, 1887, H. D. Merritt & Co., manufacturers of rolled plate chains, etc., will fill orders and ship goods to their customers direct from their factory, North Attleboro, Mass., instead of from their New York office, as heretofore. The New York office will remain at No. 10 Maiden Lane, where a full line of samples will be kept.

Mr. E. L. May, of Defiance, Ohio, was recently robbed in Chicago of a lathe and a full set of chucks, together with a large variety of tools, including a depth tool and a Hall staking tool. The lathe was made by the Standard Tool Company, of Mansfield, Mass., and had a Swiss slide rest. Any one seeing any tools of this kind will confer a favor by notifying Mr. May.

On the first day of May next, the business offices in the Astor House will be converted into rooms for the use of the guests of the hotel. This will be a most agreeable change for the many patrons of this house, as it will afford them additional facilities, at the same time that it gives added rooms for the accommodation of more guests. This is a favorite hotel for out-of-town jewelers who visit this city in the buying seasons.

Daggett & Clap have met with gratifying success on their patent combination sleeve buttons with chain and pins attached. They have added many novelties to their already large line for the coming season. Brooches, cameos, ladies' buttons in great variety form a line which every jobber should see.

Mr. W. W. Middlebrook, for many years with the late firm of C. E. Hayward & Co., will hereafter travel for the firm of S. W. Gould & Co., taking the place of Mr. George L. Sweet. Mr. Middlebrook has an extensive acquaintance with the trade, having been with the old firm upwards of sixteen years, and will undoubtedly be as successful in his new place as he has been with them.

William T. Smith, the well known refiner of Providence, has just issued a very neat and useful steel plate Memorandum Calendar for 1887. It is designed for placing engagements or memorandums opposite dates dating far ahead. Mr. Smith has also issued a neat little book on whist, compiled from the best authorities. The trade will be supplied by dropping their business card to him.

A new member of the Connecticut legislature this winter is Mr. Wm. R. Hurd, long known to the trade through his connection with the management of the E. N. Welch Clock Works of Bristol. Mr. Hurd is a thoroughgoing business man, energetic and capable, and there is no doubt that he will bring to his new position as a legislator the same qualities that have made him successful as a business man.

Mr. Andrew H. Potter, of Boston, had been missing goods from his store for some time, and recently a Brattleboro dealer chanced to mention to him a bill of goods he had recently purchased from Samuel W. Cushing, a young man who had been in Mr. Potter's employ. Mr. Potter recognized the goods as having been stolen from him, and he caused the arrest of Cushing who was held to answer. The goods, of course, were recovered.

Attention is directed to the advertisement of the Blauer Watch Case Company, of Chicago, wherein they correct the impression that had obtained a foothold to some extent in the trade, that their company was controlled by parties engaged in other lines of the jewelry trade. They deny this impression with emphasis, and declare that no person engaged in the jewelry business has had any connection with the company or any voice in its management since May last.

Edward Cheever, of Attleboro, formerly a member of the firm of Healy Bros., manufacturers of jewelers' findings, has been arrested and indicted by the grand jury on a charge of arson and robbery alleged to have been committed in connection with the partial burning of Freeman's jewelry factory at Attleboro Falls last August. Pinkerton's detectives have been working up the case ever since the fire, and finally secured the evidence upon which the indictment was based.

Mr. Isaac Heidenheimer, the principal creditor of Julius Socha, of Galveston, Texas, caused the stock of Socha to be sold at auction to satisfy his claim. It is reported that the goods sold better than was expected, and that there was a goodly sum realized above the amount of the indebtedness which they were sold to satisfy. In regard to this failure, both the N. Y. Jewelers' Association and the Jewelers' Board of Trade put out a "danger signal" when he began to buy liberally and thereby saved large amounts by refusing to fill his orders.

A man named Hugh T. Dickinson, claiming to be an insurance agent living in Brooklyn, was recently detected while trying to steal a watch worth \$100 from the store of Mr. Adolph Schwob. The prisoner was held to answer, but was subsequently released on the plea that he is a kleptomaniac. There have been a good many kleptomaniacs around lately, and it would be well to send a few of them to the insane asylum for a time. Unless their friends can protect tradesmen from their depredations, the law ought to step in and take care of them.

Mr. F. Quinche, of 17 Maiden Lane, is, as he intimates in our columns, the sole agent in this country of the Borel & Courvoisier's watches, which have now been very considerably reduced in price in accordance with the spirit of the age. Mr. Quinche has also several lots of watches which have been placed in his hands by the agents of firms in liquidation, which must be sold by a certain date. These watches are fine and medium grades and are offered at a large discount.

The final report of Mr. T. C. Bloch, assignee of Sampliner, Adler & Co., of Cleveland, was filed Dec. 11th, and shows that the creditors will, if the report is approved by the court, receive about nine per cent. of their claims. The assignee received in all from the estate \$14,608.89; he disbursed \$2,948.92; the mortgages amounted to \$8,320, leaving in the hands of the assignee \$3,339.97. The amount of the claims of creditors allowed was \$37,026.54. The report will, no doubt, be approved and the assignee discharged.

Mr. Charles W. Ward, the fortunate son of the Michigan lumber millionaire, has recently returned from Switzerland for the purpose of placing on the American market the Non-magnetic watch, and has opened an office at 177 and 179 Broadway. Young Mr. Ward is the general manager for the company, and proposes to devote his time, energies and fortune to pushing its business. An invoice of these watches which recently arrived, shows they are of excellent finish, and indicate that they are to be classed in the front rank of Geneva watches.

Hancock, Becker & Co. have just added to their already large line a new ring, made under a new method strictly their own, and guaranteed to give satisfaction; they have called it the Solid Gold Supported Ring, and they are set in all styles of fancy stones. In addition to which they have many new styles in lace pins, brooches, drops and novelties in original designs, mounted with fine and imitation stones. Their goods can be had from any leading jobber. Mr. Hancock, the outside active member, will look after the interests of his firm during the coming season.

The General Term of the Supreme Court has reversed the sentence of Michael Kurtz, who was sentenced to eighteen years and six months imprisonment for his share in the Marks burglary. It was claimed that detective Pinkerton induced Kurtz to make a confession by promising to use him as State's evidence, and that therefore his sentence was unlawful. Should the Court sustain this decision, both Kurtz and Porter, who is now out on bail, will escape further punishment. This will be a matter of great regret, for they are both notorious thieves, and ought not to be at liberty.

Jacot & Son have recently introduced a new and valuable improvement in musical boxes, which they have patented here and in most foreign countries. It is designed as a safety check on the spring that imparts the movement to the cylinder, or to prevent its running away in case of the breaking of the fly-wheel. Many musical boxes have been seriously disabled in consequence of the check on the spring getting out of order and permitting the cylinder to "run" without any break on it. This new device is a positive safeguard against any such accident, and is the only device of the kind that accomplishes its purpose. They keep constantly on hand a full line of musical boxes of every kind, and at prices to suit purchasers.

In the Special Term of the Supreme Court recently Judge Van Brunt decided that the assignment made by the firm of Kossuth Marx & Co. in September, 1885, was fraudulent, and must be set aside. The firm was comprised of Kossuth, Adolphus and Jacob Marx, jewelry dealers in Maiden Lane. The liabilities amounted to \$1,000,000. Jacques, Meyers & Co., with other creditors, brought the suits on which the assignment was set aside. Judge Van Brunt decides that preparations for the assignment were going on for a long time before the failure. It is believed that the firm purchased jewelry worth \$230,000 abroad in the spring of 1885, and with the proceeds paid old debts and secured the liabilities to friends of the company to the loss of the rightful creditors. The assignee will appeal from the decision.

We have received from Messrs. John Scheidig & Co., of 43 Maiden Lane, one of the most comprehensive catalogues ever issued to the trade. It is printed on fine paper, and contains illustrations of opera glasses, eye-glasses, spectacles, field and marine glasses, telescopes, microscopes, magic lanterns with endless scenes and views and in fact all other goods in this line. A wholesale price list is also included.

Mr. J. W. J. Pierson, the well-known and popular representative in this city of the Howard Watch and Clock Company, recently tendered his resignation, to take effect on the first of January. Mr. Pierson has been identified with this company for nearly eighteen years, and has been its trusted and confidential agent during all this time, giving his best energies at all times to secure success for it. It is not too much to say that he has been one of the most popular men in that line of business, and by his popularity has made many warm and permanent friends for the company. For some time past Mr. Pierson's health has not been good, and he has felt the need of rest from business cares. To secure the required vacation and change he has resigned from the company. He will devote a portion of his time for awhile to closing up some matters for the company, after which he expects to take a good long rest. His host of friends will join in good wishes for his future.

In March last a package valued at \$1,600 was sent by express from Atlanta, Georgia, to Heller & Bardel, of this city, but never reached its destination. It is believed that the goods were stolen at Atlanta by a colored man who was in the employ of the express company. Heller & Bardel held the Adams Express Company responsible for the goods or their value, but being unable to obtain satisfaction, the Safety Fund Association took the matter up, and at a meeting of the Board of Directors recently held, it was resolved to prosecute the case thoroughly. Report says that the goods were recovered from the thief who stole them but that the express company will not return them until they are reimbursed for their expenses, some \$250, in prosecuting the thief. The Safety Fund Association will investigate the case fully, and when the exact facts are ascertained it is probable that an amicable settlement will be arranged. Some stories reflecting severely upon the express company have been in circulation but while the case is undergoing a judicial investigation it is scarcely fair to repeat them. The Adams Express Company has been doing business with the jewelry trade for many years, which it could not have done if it was in the habit of treating patrons in the manner they are charged with treating Heller & Bardel in this instance. There is no question that the goods were lost, but who is responsible for the loss is the matter in dispute.

Early in September, a man giving the name of Edward Wall called at the office of Mr. J. W. Block in Maiden Lane, and asked to see some diamonds. While examining them he succeeded in abstracting one worth \$225, with which he got away. Subsequently Mr. Block met him in the street and charged him with the theft, when he promised to settle if Mr. Block would accompany him up-town. On their way, however, Wall eluded Mr. Block, and the latter then became convinced that the man was a "crook" and reported the matter to the detectives. He then found that Wall's photograph adorned the Rogue's Gallery. The detectives soon after captured their man and Mr. Block made complaint against him, on which he was held for trial. Wall had a confederate in the person of a fine looking woman, in whose company he succeeded in robbing Louis Strasburger & Co. of two loose diamonds valued at \$400, and single stones from Herman Levy and John R. Greason & Co. These gentlemen lodged complaint against Wall, charging the woman, who was also arrested, with being his accomplice. It was believed that Wall would plead guilty, but the woman denied complicity and announced her intention of submitting to a trial. They were held to await the action of the Grand Jury, which subsequently found indictments against them and they are now awaiting trial. When arraigned for trial the prisoner plead guilty and was sentenced to five years in State Prison.

The Charleston, South Carolina, and Greenville, North Carolina, papers of a recent date contain extended accounts of the formal opening of the Mansion House in the latter city, which has recently been remodeled and refurbished by Mr. T. M. Avery, president of the Elgin Watch Company. This hotel belonged to the widow of Mr. Avery's son and her sister, Miss Swandale, both of whom were natives of Greenville. Mr. Avery and his family have been in the habit of spending their winters there, and recognizing the importance and desirability of Greenville as a winter resort, resolved to give it the advantage of a thoroughly modern hotel. In accordance with this plan, upwards of \$20,000 have been spent in refitting the house, and it is now one of the finest and most convenient in the entire South. Experienced hotel managers, in the persons of Messrs. Gates and May, were found to take charge of it, and on the occasion of its completion they gave a house warming, to which all the elite of Greenville were invited, together with many favored ones from Charleston. About 200 ladies and gentlemen responded, and were entertained with a grand ball and a banquet. The papers are loud in their praises of the elegance of the house and of the attention they received from their hosts of the evening. Mr. Avery was present and in the course of a brief speech he was called on to make, explained how he came to be interested in the hotel, and what the purpose of the proprietors was regarding it. During the present month, Mr. Avery will escort a party of jewelers to Greenville to show them what an enterprising man can do in promoting the interests of a community, and to convince them that he knows how to run a hotel as well as a watch company.

An extensive swindle was attempted upon the jewelers of this section recently by some one claiming to be T. B. Steacy, of Brockville, Ontario, who is well known to the trade. The following letter received by Tiffany & Co. explains the method adopted :

BROCKVILLE, ONT., DEC. 6, 1886.

Messrs. Tiffany & Co.,

I have a customer who wants for presentation on Thursday evening next from your establishment and in case bearing your name, a pair of solitaire diamond ear rings worth \$1,000.

I should like to please my customer and would like to make something on the sale, say, 10 per cent. If you can make the figures so as to accommodate me, I should like you to send me several pair on 3 days memo., for my customer's selection, say \$800, \$1,000 and \$1,200 or \$1,500 with velvet case for one pair only. I am a stranger to you, but am long established here, and have unencumbered real estate in store, residence and tenement property. The time is too short for references; if the general sources of information open to you regarding my responsibility and credit are not satisfactory you may ship \$800 pair C. O. D. If otherwise, and several pair are sent I think highest priced pair will be sold. Draft on N. Y. will accompany goods returned. To avoid custom house complications you may ship to me at Redwood, Jefferson Co., N. Y. Morristown is the nearest point on the American side, but all business done there by Brockville merchants, I am told, is known to custom house officials here.

Yours truly,

T. B. STEACY.

This letter bore a close resemblance to the handwriting of Mr. Steacy, and was written on paper bearing his business card. Various persons received orders for jewelry to be similarly sent. Fortunately Mr. Steacy was notified that the goods had been sent as directed, and he at once saw that a swindle in his name was attempted. He promptly telegraphed to the express agent at Redwood not to deliver any packages addressed to him to any one, and forthwith took the cars for that place himself. On arriving he found various packages which had been called for by a stranger, but delivery had been refused. He ordered the goods, variously estimated at from \$40,000 to \$50,000 in value to be returned to the senders, who were thus saved from a heavy loss. Among the firms who had sent goods were the following: Smith & Knapp, Theodore B. Starr, Mulford & Bonnet, F. Quinche, M. B. Bryant & Co., A. H. Smith & Co., Tiffany & Co., A. W. Sexton & Son, Adolph Goldsmith, R. H. Dumbleton, New York; Bigelow, Kennard & Co., H. B. Dwight, Boston; Booz & Co., W. H. Sheaffer & Co., Philadelphia. The robbery was well planned, but failed of success through the prompt action of Mr. Steacy.

Mr. Enos Richardson returned from Europe on the steamer *Eider*, Dec. 12th, after an absence of eight months. Mr. Richardson went to Europe solely for recreation and health. This is the first vacation he has ever taken of any account since he first went into business over fifty years ago. He has led an active business life all these years, and has been noted for his energy and enterprise. The trip evidently accomplished all that was expected of it, for Mr. Richardson returned looking as healthy and rugged as though he were fifty years younger. He made the grand tour of Europe and saw about all there was to see, and was not outdone in adventures by any of the more juvenile tourists.

Two notorious burglars, named Billy Mack and Edwin Forrest, were recently captured in St. Louis while in the act of attempting to get away with a portion of the jewelry secured by them from the store of E. H. Kortkamp, which they robbed on Thanksgiving night. Detectives had been shadowing them for a long time, and finally captured them with a large portion of the goods in their possession, which they were about to dispose of. The burglars resisted arrest, and tried to use their revolvers, but the detectives got the best of them, disarmed them and recovered the stolen property. The burglars then confessed, and told where the remainder of the goods had been secreted, which was in a stable used by an express driver named Albert Robb. The goods were found as described, and Robb was also taken into custody. All three of the prisoners were held for trial.

That was a very bold thief who robbed the store of Mr. J. H. Johnson, corner of Broome street and the Bowery, on the eve of November 29. He was a nicely dressed young man, and came into the store about six o'clock in the evening, when five persons were on duty in the store, and asked to see some diamond rings, saying that he wished to purchase one worth \$25 or \$30. The diamonds were kept in a case near the door and a clerk took out a tray to show them. The young man spent considerable time in looking them over, and finally asked to see one in a tray in the show window. The clerk reached for the tray in the window and the young man began looking them over. While he was so engaged an engraver employed by Mr. Johnson came in with some work, and the thief took advantage of the distraction thus caused, and grabbing the tray of diamonds he dashed into the street, and before he could be pursued had disappeared entirely. He was seen to turn into a side street, and subsequently the empty tray was found in the street. It was dark at the time and the number of persons in the street was great, so that when the thief had once mingled with the crowd it was impossible to follow or identify him. All the diamonds and mounted stones in the tray were, of course, secured by the thief. Mr. Johnson subsequently offered a reward of \$1,000 for the recovery of the goods, and Inspector Byrnes, of the detective force, had cards printed and sent to all the pawnbrokers of this and other cities describing the goods. A few days later a local pawnbroker brought to the Inspector a ring which had been pawned with him by a young man. This proved to be one of the stolen rings, and from the description given of the man by the pawnbroker the detectives succeeded in arresting the thief. He proved to be William Wanser, who was stopping at a Bowery hotel. He confessed the theft, saying that he had just arrived from Chicago, and, being out of funds, he conceived the idea of robbing Mr. Johnson, whose show window was especially tempting. He said he had pawned thirty of the rings and told where they could be found, so that Mr. Johnson recovered the greater portion of the stolen goods. There were sixty-six rings in the tray, but the thief says he only got forty of them, the remainder probably having been lost during his flight. This is the fourth time Mr. Johnson has been robbed, and in every instance the thief has been captured and received punishment. The lack of success the "crooks" have with Mr. Johnson ought to secure him immunity from their depredations in future, for to rob him seems to be a sure route to State Prison. The prisoner was tried before Judge Gildersleeve a few days since and sentenced to State Prison for five years.

Mr. A. A. Green, junior partner of the firm of Smith & Green will be in the trade immediately after the holidays to greet his many friends in the jobbing trade, with a beautiful line of fine rolled plate chains, made in all styles and designs for spring season.

The following is a full telegraphic account of the jewelry robbery that occurred at Minneapolis, Dec. 22, and which was the boldest that has ever been known in the jewelry trade: There was a sudden crash of glass on Nicollet avenue at ten o'clock last night, and passers-by between Washington and Third streets looked around just in time to see two men leap hurriedly into a waiting cutter and dash madly up the avenue, the driver lashing his horses in a fashion to show the party were in the most desperate kind of hurry. A moment after a bareheaded man, flourishing a revolver, rushed up the street after the cutter, yelling "stop thief!" with an energy that communicated itself to the spectators of the unequal chase, who joined in the hue and cry and for a moment forgot to ask what had happened. The man with the revolver soon caught a passing cab and disappeared in the chase. Another moment and a cutter with a policeman in it went in pursuit like a flash, and then the procession having passed, the crowd turned back to see what it was all about. The boldest robbery that ever occurred in Minneapolis had just been committed in the jewelry store of J. R. Elliott, at 251 Nicollet avenue. The thieves had broken in one of the large plate-glass windows with a blow with an axe, and reaching through the opening thus made had grabbed a quantity of jewels displayed in the window and gotten away with the booty, which was valued at \$2,500. A big \$500 diamond which belonged to a man named Franklin, and had lately attracted crowds of treasure lovers about the window, was among the gems stolen and was probably the principal object of the robbery, for gems worth ten times the amount in the aggregate were untouched in the same window and within reach of the thieves. Considering the hour, the crowds of people on the street and the fact that Mr. Elliott and his clerks had not yet left the store, the burglars displayed an amount of criminal nerve that is seldom met with outside the yellow covers of "Dick Turpin" and "Sixteen-String Jack." The robbery was at once reported to police headquarters, and the entire detective force set to work upon it, but the developments of the night's work were meagre and resulted only in the following facts: The thieves had evidently planned the affair carefully, for the cutter or double sleigh in which they made their escape had been noticed standing in front of the store for an hour before the robbery occurred. The two men who actually committed the deed no one noticed on the walk, though they were evidently close by and watching for the favorable moment that should intervene between clearing the store of the customers and the removing of the jewels from the window to a safe. When that instant came they dashed forward out of the gloom where they had lurked, and one of them pushed a heavy stick through the handles of the door to prevent its being pulled open from within. It took but an instant to secure the doors, and the other robber, raising a heavy lumberman's axe, dashed two terrific blows against the window, showering the heavy glass into fragments and opening a hole into the square window. Each robber grabbed a handful of gems, one securing the big diamond, and the other a tray of rings, and both flew to the cutter and leaped in. E. A. Atkinson, a clerk, gave chase with a revolver as soon as he could get the door open, and officer Foraskow, who was at the corner of Washington street and the avenue, jumped into a passing cutter and did likewise, but the thieves had a good start and, after running up Nicollet avenue to Twelfth street, turned there towards Hennepin and were not seen again. A few moments later a passer on the suspension bridge saw a double sleigh containing three men cross the bridge on a run, and it is supposed that they were the robbers, but search at St. Paul and along the road thither, which was made at once, gave no clue. The thieves spilt some of the rings on the walk, which were found and returned. They could have got \$25,000 worth of gems in the same window, small ones, but very valuable.

