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POTTERY IN AMERICA.

FROM THE COLONIAL TIMES DOWN TO THE PRESENT DAY.

Effects of Protection on Trenton's Pottery Interests—Character and Value of Wares Manufactured There.

The establishment and progress of the pottery art in the United States has become an important factor in the general prosperity of our country.

Among the earliest records of any pottery in the colonies we find one in 1663, situated in the city of New York, and perhaps a century later we find one in the city of Phiiadelphia, where good porcelain was made. These were very small affairs; and from time to time thereafter small potteries were established, which, after a longer or shorter period of feeble existence, disappeared.

The pottery industry, as now known in this country, had its rise during the early years of our late war, and is one of the results of that war, from the fact that the premium on gold by reason thereof furnished a protection, in addition to the tariff which justified the building of potteries and the employment of capital to run them. Wages being one hundred per cent. higher in America than in England, the increased duty of forty per cent. was still insufficient to bring any potteries into existence, except for making some special articles only, such as door-knobs, etc., and it was not until the additional protection was added of the gold premium before mentioned, that in 1862 and 1863, pottery enterprises began to be organized.

They were very modest affairs, at first making the commonest quality of goods, and of such articles mostly that were the most profitable to make. There were a combination of fortuitous circumstances during the "sixties" to foster the growth and strength of the little potteries. First, the very high premium on gold enormously increasing the cost of foreign crockery. Second, the absolute want of crockery at the South immediately after the close of the war, caused by the entire four years supply having been cut off by reason of the blockade of the Southern ports, which caused an almost unlimited demand for crockery wares at enormous prices. and enabled the young potteries to realize large profits even for their inferior quality of goods. Third, the gold premium was maintained long enough to secure to the rapidly growing potteries remunerative profits for a series of years, enabling them to gain knowledge and experience with pecuniary strength sufficient to retain a firm foothold after the resumption of specie payments, and they began to seriously feel the strong and persistent foreign competition which at once set in with renewed vigor.

A FLOURISHING INDUSTRY.

The pottery industry, beginning less than twenty-five years ago in a very small way, has steadily grown until at this time it has reached a point where it is supplying 75 per cent. of the staple white goods consumed in this country, and about 40 per cent. of the finer quality, and the value of its annual production amounts to upwards of $8,000,000. It gives employment to many thousands of artizans in the potteries, besides thousands of persons employed in mining the clay, coal, etc., and preparing the materials for the potter's use, involving the payment of millions of dollars in wages.

In fact there is no article of mannfacture in which the item of labor enters more largely into its cost than in pottery wares, and very few that equal it.

The great bulk of materials used are comparatively valueless until the labor of mining, preparing, etc. is expended upon them, and it is found that labor in all its forms will aggregate 90 per cent. of the total cost of plain white pottery wares for domestic uses.

The decorative branch of the business has of late years attained great importance, and thousands of persons are now employed therein, a large proportion of whom are young women and girls, thus opening a new and very suitable avenue of employment for female labor which is both remunerative and elevating in its character.

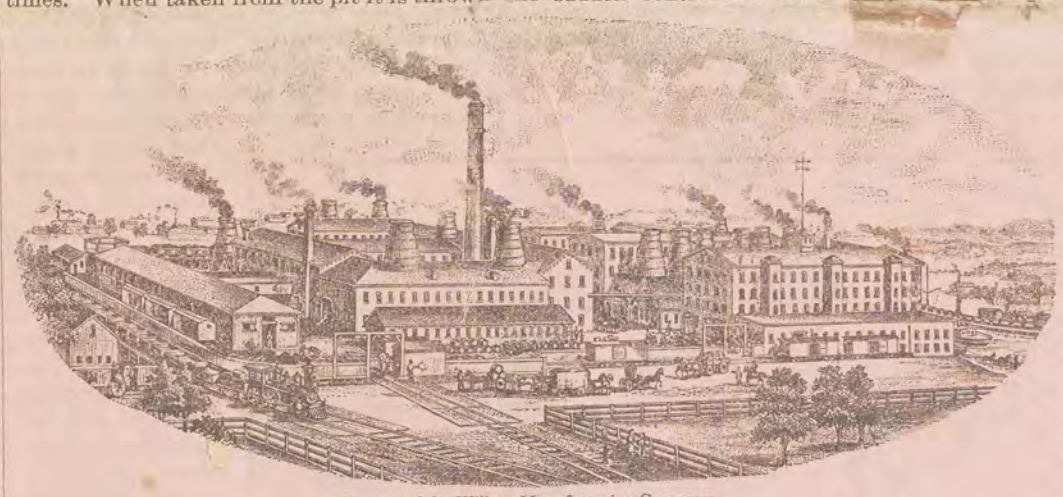
An additional and important benefit which the development of the ceramic art has bestowed upon the American people is the cheapening of these goods to the consumers; the price in 1860 and before the establishment of our potteries having been one-third more than at the present time.

RAW MATERIALS AND PREPARATIONS.

The component parts of all china or porcelain and crockery are substantially the same, only varying somewhat in proportion, viz; kaolin or china clay, quartz and feldspar.

These several materials are found in almost all parts of the United States, north, south, east and west. The preparation of these materials for potters use gives employment to thousands of men, teams, machinery, etc.

The kaolin or china clay is largely mined in Delaware and Pennsylvania with some in other states. It has been found in many other localities but never developed to any great extent, notably in Tennesee, North and South Carolinas and Georgia. The clay in Delaware and Pennsylvania is taken from pits, opened by removing the super incumbent earth, varying from a few feet to fifteen and more, sometimes. When taken from the pit it is thrown into a large tank with water, in which an upright shaft with long arms rapidly revolves. When the clay is thouroughly mixed with the water, it is drawn out, passes into wooden troughs, and runs slowly several hundred feet allowing the sand (which amounts to from 30 to 60 per cent. of the whole) to settle, the water carrying with it the pure clay to vats where it is allowed to settle, and when ready, it is passed through hydraulic presses—the water mostly pressed out and dried ready for shipment to the potteries. The flint and feldspar are quarried out of their respective ledges and each ground to a powder, fine as the finest flour, when they are ready for use.



Pottery of the Willets Manufacturing Company.

PROCESS OF MANUFACTURING.

For use at the pottery these materials are shoveled again into large tanks with upright revolving shaft with long arms thereon, and thoroughly mixed together, then passed over lawns or seives of the finest silk to take out any dirt or deleterious substances, into a storage tank, from which the slip (for such it is called) is pumped into presses by which the water is mostly expelled and it becomes almost like putty and ready for the operatives' use.

The prepared clay after passing into the artizan's hands, by use of the trowing wheel, jigger and other machinery, is formed into such articles as can be made by the use of machinery, such as plates, cups, saucers, bowls, etc. The number of articles for which machinery can be used in making are small in comparison to the number of those which must be worked into the moulds by the hands only. All the goods whether machine made, or hand made, must be made in plaster of paris moulds as no other material can be found having the necessary property for absorbing the water from the clay vessel after having been made, which is absolutely indispensible.

The finished articles in the clay state are carried from the artizan's shop into the "green room," where they remain until quite dry and ready to be placed in the biscuit kiln for the first fireing.

THE BISCUIT KILN.

From the green room the ware is taken and placed in seggers. A segger perhaps needs a little explanation. It is an earthen vessel resembling an old fashioned bandbox in shape, in which the ware is placed to protect it from lmmediate contact with the flame and smoke which has a tendency to color or stain the ware. These seggers are placed in the kilns (which are round ovens about sixteen feet in diameter and about the same height) one upon the other about twenty-four high in columns called bungs. In each kiln there are about eighty of these bungs, making in all about 2000 seggers in a kiln. In Trenton these kilns are fired with anthracite coal, while in many other places they are burned with soft or bituminous coal. About fifteen tons of hard coal is required to burn or fire these kilns in about fifty hours. Biscuit kilns require about eighteen days work to fill them with ware. After the biscuit kiln has been fired. great care must be taken to cool it slowly, otherwise the sudden contraction from rapid cooling inevitably causes great loss by breakage, both of seggers and ware. When the kiln is sufficiently cool to be opened, it is soon after cool enough to have the goods, which are now biscuit ware, taken or "drawn" out and carried to the "biscuit warehouse."

In the biscuit warehouse, the ware is looked over. The cracked and broken are taken out and the good ware is then carefully brushed to remove any sand or dirt, making it as clean as possible and when rough is also carefully sand-papered. This done, the ware is taken to the dipping tubs to be dipped into the glaze. This brings us to the most important part of the whole process of making ware, and a word about the glaze may be in order.

The glaze is a covering of very fine glass, so composed and prepared as to be as homogeneous as possible with the body to secure the very essential element of like expansion and contraction of body and glaze.

The glaze is composed of flint, feldspar, boracic acid, whiting, zinc and white lead, all ground together as fine as it is possible to make them, then mixed in water to a consistency of rich cream ready for dipping the ware.

FINISHING TOUCHES.

The ware is then carefully dipped by hand, piece by piece, so that every part of the surface be evenly coated. At once the absorption of the ware draws in the water, leaving an even coating of the glaze all over the respective pieces. The ware is then placed on boards about six feet long and ten to twelve inches wide, and placed in racks or stillages, as they are called, ready to be placed in the glost kilns.

The glost-kiln is a duplicate of the biscuit-kiln before discribed, and the dipped ware is placed in seggers for their protection as before, but the seggers are carefully glazed inside to prevent them drawing the glaze from the ware, which would be the case were they not.

The dipped ware is placed in the glost seggers in a different manner from the biscuit, as it is necessary that every piece be placed entirely separate from any other piece, otherwise the glaze would fasten them together.

The glost fire is carried to a point to vitrify and flow the glaze, which does not require the degree of heat reached by the biscuit fire. The goods when drawn from the glost-kiln are carried to the glost warehouse, where they are dressed and selected, taking out the imperfect, and the process is completed. During its whole course each individual piece has passed through the hands of upwards of thirty persons.

THE EXCELSIOR POTTERY.

The affairs of this Company are managed by Joseph Willets, President, Daniel Willets, Secretary, and Edmund R. Willets, Treasurer, who for many years previous to forming this Company were importers of crockery and agents for some of the principal pottery firms in England. These gentlemen, from their life experience in this line of business, thoroughly understand the wants of the trade, [illegible] the shapes and [illegible] of decorations best adapted to it.

This pottery was established by the late William Young, together with his sons and others, who began in 1853 to make door-knobs and hardware trimmings. Soon after that date the present site on the Delaware and Raritan Canal was purchased, buildings erected, and the business removed there; Messrs. Young soon thereafter becoming sole proprietors, and to them the development of the pottery industry was very largely indebted in the early years of its struggle to obtain a firm foothold on American soil, and to them is to be ascribed the honor of having made in Trenton the first white crockery for domestic use.

After a quarter century of successful poting the sons before mentioned sold the property to the Messrs. Willets, and retired from busiess. The increased demands upon the new proprietors for their wares immediately required larger means for production, and they had but fairly settled down to business before they began to enlarge their producing capacity by erecting an additional kiln, and so have continued to build kiln after kiln and shop after shop as the demands of their continually increasing business required, until their original plans, made when their improvements began, were completed during the past year, making it much the largest pottery in this country, having thirteen large kilns for producing the white ware, and corresponding facilities for the large quantities of decorated goods produced at their works.

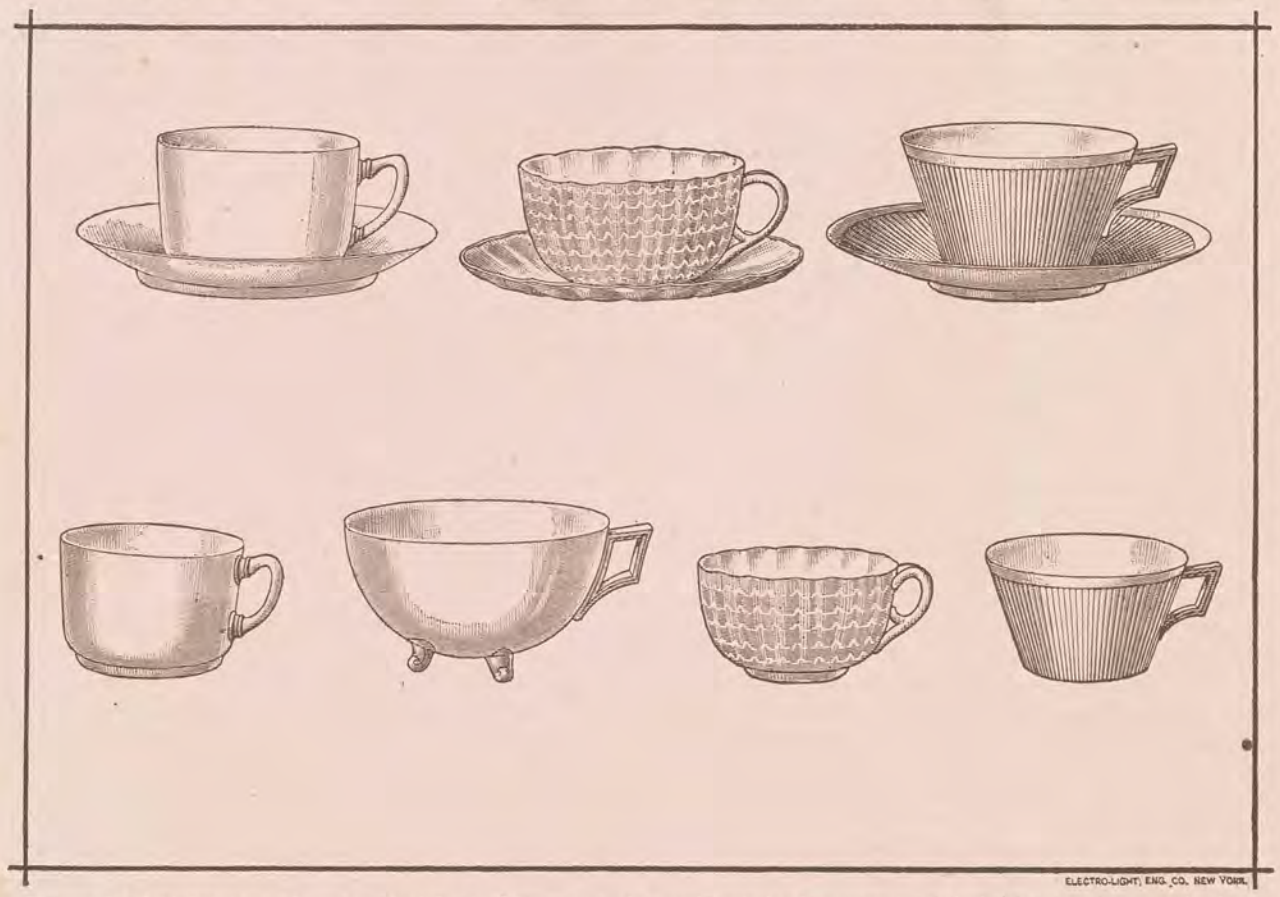
The improvements include the most complete and convenient system of railroad tracks and sidings added by the Pennsylvania Railroad Company for the delivery of raw materials, coal, etc., as well as the shipment of goods on the cars at the packing house door. Frequently cars being loaded at the warehouse door are sent direct to destination east, west or south without breaking bulk.

This pottery being situated in the Delaware and Raritan canal has arrangements with the propeller line to stop at their door daily for eastward aud southward bound goods during the season of navigation.

This location on the canal, by means of a basin therefrom, also gives water facilities for

procuring materials as well as by railroad, a means not so highly esteemed at the present time as formerly, but still valuable, and often profitably available in competition with railroad freight.

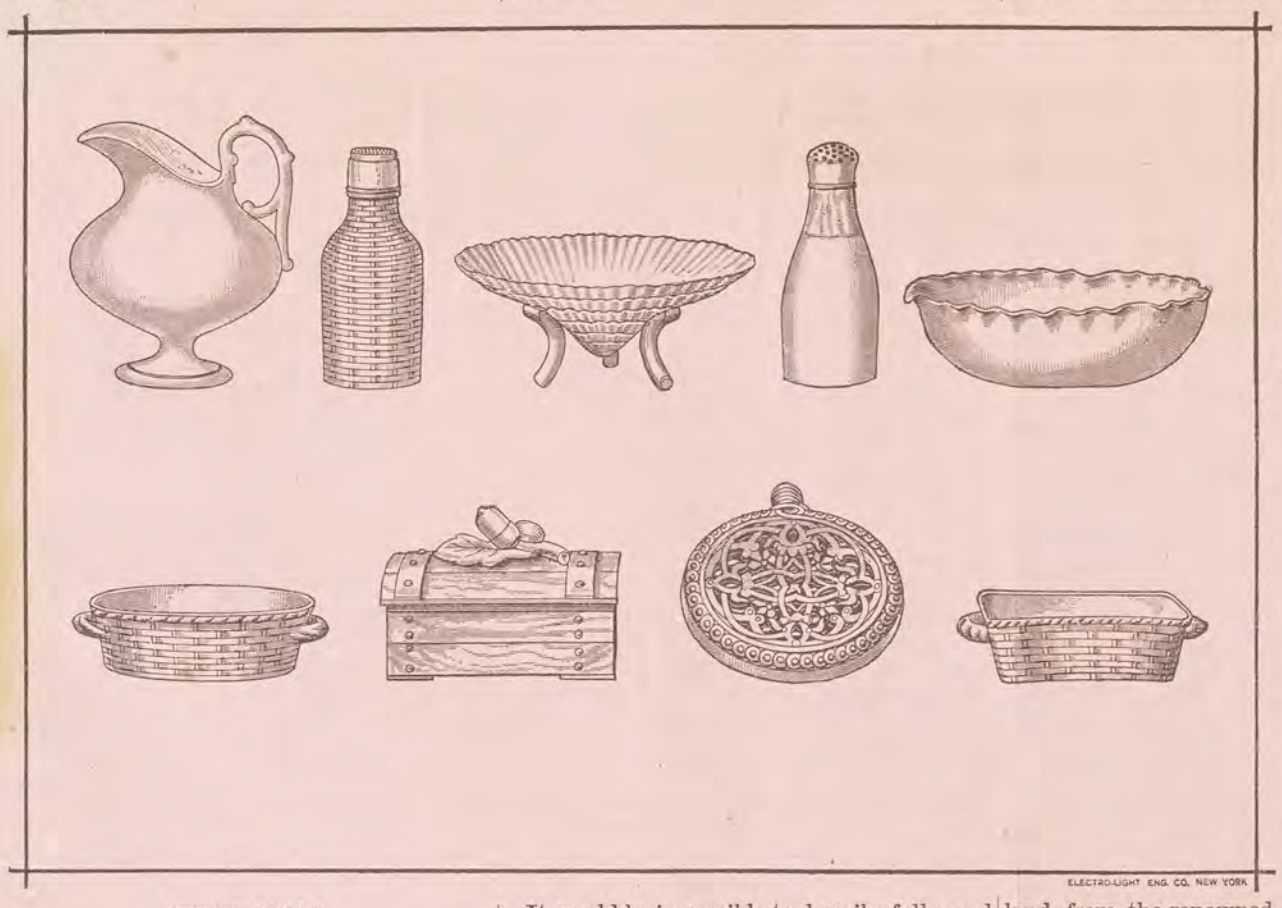
The property covers almost six acres, and the buildings have a floor space of between four and five acres. The machinery is all of the most improved patterns. The heating is by many thousand feet of steam pipe. Steam being used used exclusively for heating and drying purposes, and for running elevators in the warehouse and shops, many of them being in use about the premises.



Upwards of 10,000 tons of raw materials are used, such as coal, clay, and 1,000 cords of wood consumed in the decorating kiln and for kindling the coal fires in the large kilns.

This business requires the services of 400 operators in the manufacturing department of the white goods, and 100 in the decorating department, making a total of 500, of whom about 150 are females, many of the young girls learning the art of decoration in the decorating shops.

The producing capacity ot this pottery is $500,000, about 40 per cent. of which is decorated goods.



WHITE GOODS.

The demand for the better class of goods produced by the Willets Manufacturing Company soon absorbed the entire capacity of their works and crowded out the lower grades. They now make very large lines of white granite, thin opaque porcelain, and opaque porcelain hotel ware.

During the last forty years the great bulk of crockery used in the United States has been white granite or stone china. Before that time colored goods printed in colors, in landscapes, floral, and other ornamental designs in brown, blue and pink were in general use, many pieces of which are to be found handed down from former generations. By far the largest proportion of the goods still used in this country are white granite or stone china, all having a black stain on the under side of the pieces. This also holds true in South as well as in North America. How different is the case in European countries. There a piece of plain white wares is seldom, if ever, seen.

A considerable proportion of the crockery consumed in the United States of late years has been opaque porcelain, so named from its resemblance to French china or porcelain in its shape, color, and lightness of weight. This class of goods, although considerably more expensive than white granite, has found a large market, and the Willets Manufacturing Company have devoted a large part of their works to the production of these goods, which have made for themselves a high reputation and a large demand. These goods are made in various shapes, some of which have been modeled with a special design for effective and artistic decorations.

DECORATIONS.

The decorating shop of this pottery is the largest in this country, occupying for the painting, gilding and printing two floors, 50 by 150 feet, the whole most brilliantly lighted with gas, made by private gas works on the premises.

It would be impossible to describe fully and accurately each variety of the decorative designs and patterns used for beautifying the ware manufactured here. For dinner sets, thin opaque porcelain is used solely in oval, semi-oval, and square shapes, now so popular. Toilet sets are more largely decorated on opaque porcelain, but at the same time large numbers of the cheaper styles of decoration are done on white granite.

For dinner sets, the styles of decoration may properly be divided into three classes: under-glazed pointed, filled in with colors, and over-glaze pointed.

UNDER-GLAZE POINTED.

The Willets Company make a specialty in the decoration of this ware, which is of the finest quality and design. One of the most beautiful patterns is "The Marguerite." It is a matter of regret that it is impossible, through the agency of paper and printer's ink, to give any real idea of the beautiful appearance of these goods.

These goods are gilded on the edges always, and often are elaborately illuminated throughout, the designs producing a charming and very rich effect.

FILLED IN PATTERNS, WITH COLORS.

This line of decorations gives to many young girls employment which is improving and refining in its tendency, and work that is instructive as well as remunerative. These goods pass through the printing room, the pattern being engraved on steel or copper-plates by a steel plate engraver. The tissue paper, is passed through a press with the plate, and takes the design printed in color therefrom, and from this paper the design is, by a rubbing process, transferred to the goods. From the printing room the goods pass to the filling-in department, then through the gilding department, and thence to the enamel kiln for forcing.

ART PORCELAIN.

During the past year this company has made a great advance in the ceramic art, the outcome of long study and perseverance in their efforts to reach the front rank in the production of art goods.

To perfect their undertaking in this direction special machinery and conveniences have been erected at large expense to prepare the materials in the most thorough and perfect manner, after having been selected with the greatest care, in order to produce a porcelain of the finest body and of the most vitrious and translucent character. Many of these articles are made of egg-shell weight; others are made in the lightest weight possible for the uses to which they are designed, but all of strictly artistic character.

In pursuance of this undertaking the Messrs. Willets sent a representative to the art centres of Europe for qualified and experienced workmen who had enjoyed the advantages of study of art. Thus having gathered about them a staff of experienced workmen, modelers, designers, and decorating artists, they are in a position to make goods unsurpassed for tint, finish, and translucency by any porcelain, in any country.

With artists from the Royal Worcester Works, and Minton's in England, from the renowned china works of Germany and France, the day seems to have come when our potteries can produce ceramic art goods of which every American citizen may justly feel proud. From this auspicious beginning may we not confidently look for no distant day to see the American artizans holding the same relative position, in comparison with the foreigner inthe line of ceramic art, that he now does in the line of domestic pottery ware ?

FIVE years ago, the American manufacturer was largely following in a greater or lesser degree, the lead of England and France in shape and design; today America produces her own beautiful designs in shape and decorations.

THE PROVIDENTIAL TILE WORKS.

The art tile works, called the Providential, were started in 1885, to produce the artistic designs of Isaac Broome, who joined hands with the experienced and skillful manufacturer, Joseph Kirkham, to create a new plant where, under their own supervision, they could execute their designs. The enterprise was a pronounced success from the start. In fact, the way business has rushed in upon the new firm is phenomenal. No sooner were their goods in the market than orders began to come in from Maine to California. Wherever their samples were exhibited, they at once received the stamp of approval as works of rare design and faultless execution.

June and July of last year witnessed the first fruits of their new factory, which were eagerly secured by the trade, and orders have ever since pressed the works to their fullest capacity. The class of goods manufactured consists of tile with sculpturesque designs, shaded with colored glazes of various hues, giving great depth and richness of tone and color, to the figures and ornaments modeled upon the surface. These are used for the embellishment of mantels, hearths, baths, stoves and in a great variety of mural decorations. They form with wood, brass, and iron-work, a wealth of luxurious color and effect, that renders them a cheerful addition to the ever increasing beauty of American Homes.

The blending of colors, the contrast of light and shade, and the strong delineation of feature in their medallions, produce an effect that is in itself an artistic triumph. One class of work deserves especial mention, from the fact that this house is the only one in the country that has made its production a complete success. This is uuderglaze painted tiles. These tiles are oil designs, painted on the bare biscuit or clay, and glazed aferwards. The painting of bare biscuits is the most difficult operation connected with the making of tiles, and requires an exactitude of execution that the uninitiated cannot appreciate. At the slightest touch of the brush the oil sinks directly into the porous clay, and renders any erasures or retouching impossible. The finest work of a wood engraver does not call for such marvelous precision and technical skill as this species of tile painting. This class of work is performed by J. B. Evans, formerly Director of the famous English house of Josiah Wedgewood & Sons, and acknowledged the finest underglaze painter in the world.

The members of the firm are Isaac Broome, artist, Joseph Kirkham, ceramist, and John Robinson, general manager. They are men practically acquainted with every feature of the business, and their works show that they were to the manor born. It also shows the result of long and varied experience, combined with a constant reaching out for better designs, and still more artistic finish. Mr. Broome is, in every sense, a born artist. Elliot speaks of him in his work on pottery, as the one exhibitor at the Centennial Exhibition of 1876, whose wares deserved mention compared with European products.

THE UNION POTTERY.

Of this company, James G. Lee is president, J. Bently Pope, vice-president, and John Taylor, treasurer, The yearly capacity is $225,000; number of employees, about 200; manufacturers of white granite, or iron-stone china, stone porcelain and decorative ware; organized in 1883.

THE ANCHOR POTTERY.

This company mines and grinds its own material; makes superior table and toiletware for family and toilet use. Israel Lacy, the sole proprietor, says concerning their goods: They are free from craze; we can easily fill large orders upon their receipt; value of plant $150,000; capacaty, $200,000; employ over 200 men; manufacturers of white earthen ware, white granite, and C. C. ware.

BELLEEK CHINA.

Ott & Brewer commenced five years ago the manufacture of this exquisite ware, and conceived the idea of combining the finest grade of china with the finest metals as a decoration. "Belleek" ware is decorated in gold, silver, platinum and bronzes of any color and shade, and just enough color to liven the pieces. This product meets ready sale in the best jewelry houses in the country, such as Tiffany & Co., N. Y., Baily, Banks & Biddle, Philada., Shreve Crump & Son, Boston, also Chicago, St. Louis, and San Francisco houses. It is a line too rich and expensive for crockery dealers, and is therefore handled exclusively by jewelers who are protected in handling these goods. The aim of this firm has been to make every piece an artistic gem, completely finished in a decorative sense, instead of putting out a cheap article to catch trade. To reach

a striking effect, cost has not been considered.

The line comprises goods from the finest cups and saucers *in the world*, to vases elegant in shape, rich in exquisite combination of colors, and fit to adorn the boudoir of a princess of the royal blood. The trade has been most flattering in their reception of the ware, and unite in saying that there is nothing in the market that can compare with it in design or finish. To intelligently understand this ware, one must see it. Each piece is a separate study, and can no more be satisfactorily described than a rare painting by one of the old masters. No cuts of the ware are issued for the same reason. To fully appreciate its delicate beauty you must interview Belleek china, prepared to enjoy a rare treat, for such it will be.

The value of the plant is placed at $250,000. The product for 1886 was in value, $350,000. Six hundred hands are employed in the manufacture of their wares. The works were established in 1860. The members of the firm are Joseph Ott and J. Hart Brewer.

TERRA COTTA WORKS.

The Trenton Terra Cotta Works rank second to none in its line in the country in the high standard of its products and extent of its output. It is engaged in the manufacture of fire brick for rolling mills, forges, foundries, or for any usages where it is necessary to withstand intense heat, besides vitrified salt-glazed sewer pipe, with branches, bends and traps; plain and ornamental chimney tops; chimney flues for smoke, hot air and ventilation, as well as vases, statuary and garden ornaments of various other patterns. Other features of its trade are the production of such potters' supplies as fire brick of various shapes for kiln purposes, decorating and slip kiln tile, seggers of various shapes for glossed ware and biscuit, and prepared wad and segger clays. The company use only the finest of material, and their methods of manufacturing are the result of long years of experience, and may be described as the epitome of the progress that has been made in this trade. Their plant covers in the vicinity of two and one-half acres; consists of several large and small buildings, and is equipped throughout with the finest mechanical and other facilities that have ever come in vogue in answer to the requirements of the potter's trade.

In fact, throughout the entire establishment nothing is lacking that can facilitate or cheapen production in the least. The products of the Trenton Terra Cotta Company are certainly the equal of any in the market, and by many authorities are given the preference over similar goods of all other makes. Of its three leading specialties, it may be said its fire brick is practically impervious to the action of heat. Trenton vitrified salt glazed sewer pipes are the best in use, while its steam pressed seggers are worthy of universal adoption on the score of economy. The works operated by this company have been in existence nearly thirty-five years, while it has a record dating back twenty years. The officers are: Joseph McPherson, President, and O. C. Bowman, Treasurer and Secretary. About sixty-five men are employed at these works, which are said to always run full. Capital invested, $150,000; plant and real estate, $120,000; personal, $30,000; out-put during 1886, net, $85,000; hands employed, 65; clay consumed, 4,000 tons; coal consumed, 2,000 tons.

MAJOLICA WARE.

Few species of earthen ware have enjoyed a longer period of popularity in this country than majolica ware. Although of late years popular favor has gone elsewhere, and these goods are no longer the craze they were a decade ago, they are still in large demand, especially among the middle classes. At one time there were no less than thirteen manufacturers of these goods in the country, but to-day there are but two, and the largest in the country is located in Trenton, and known far and wide to the trade as Joseph Mayer, formerly Mayer Bros. Mr. Mayer commenced at the potter's trade in England when but seven years old, and has at command an experience of over thirty-seven years. He is therefore thoroughly conversant with every detail and requirement of the trade, both from practical and theoretical standpoints, and not only knows how every operation should be conducted but can perform it himself if necessary. Some ten years ago he commenced on a small scale his present business, and with limited capital, small premises, and many other disadvantages against larger rivals, he developed a trade of the largest magnitude, and to-day stands as the leading manufacturer in his line in the United States. He occupies a commodious and well-arranged factory at the corner of Third and Second streets, which is fully equipped with every mechanical and other facilities of the latest improved pattern that the peculiar exigencies of his business have called into vogue. Here he employs some 106 hands, and makes a specialty of the production of majolica ware. He uses only the finest quality of material, and pays the closest attention to all details of workmanship.

DELAWARE POTTERY.

Oliphant & Co. are the proprietors of the Delaware Pottery, situated near the Prospect Street Station of the Philadelphia & Reading Railroad. The members of the firm are: D. W. Oliphant, Charles Fay, Hughes Oliphant, H. D. Oliphant, Thomas Connolly, and R. C. Oliphant. They manufacture sanitary specialties, plumbers', druggists', toilet and tea ware, and ivory china, plain and decorated. They are running four kilns to full capacity, and are building a fifth. This pottery nas been in business only two years, and has made a decided success. They report the prospects for business in 1887 as exceedingly good. In sanitary specialties, this pottery has made a decided hit producing pieces which foreign manufacturers have been unable to duplicate. Their druggists' ware is gradually taking the place of imported goods to their great satisfaction. In addition to the lines mentioned, the firm fill orders for articles to meet special requirements, such as withstanding steam at high heat, acids, etc. They can show letters of acknowledgement from manufacturers as to the excellence of their work. Lastly, they manufacture "Belleek" china, which is as delicate in construction and exquisite in color as rare flowers. The ware simply baffles description.

Burroughs & Mountford manufacture superior white tiles for walls, bath-rooms, etc.; also printed, enameled, and art tiles, embossed tiles, and in relief for walls, hearths, bath-rooms, mantels, fine stoves and general interior decorations. This firm supplied the white tile for the Public Building in Philadelphia. They make a superior white tile that will compete with the finest imported white tile. Value of plant about $250,000; business for past year about $300,000; hands employed about 400. They make the finest quality of thin porcelain in dinner, tea and toilet wares, which is sold in plain white or decorated. Firm organized December, 1879; members, Joseph Burroughs and Elijah Mountford.

The Trenton China Company has an authorized capital stock of $100,000, and a capacity for manufacturing about double that quantity of goods annually. They have practically rebuilt their place the past summer, largely improving and increasing their facilities, and are now in excellent shape for business. The members of the firm are: R. S. Staples, President; Thomas A. Bell, Treasurer; James Clarke, Secretary; John W. Tatum, Assistant Treasurer and General Manager.

BALTIMORE'S BIG BALL.

The late ball given by Mr. and Mrs. Robert Garret is still the talk of Baltimore and will be for a long time to come. None of the published descriptions did the affair full justice. It was more gorgeous and magnificent than the famous Vanderbilt ball, though of course not so extensive. So said the New Yorkers who were here. Imagine an immense conservatory filled with one of the finest collections of plants and exotics in this country. Imagine fountains and cascades at every turn in the room, with perpetual rainbows spanning them—the result of carefully arranged electric lights—and various kinds of fish swimming in basins that were supported by serpents and strange looking snakes. Ascend the staircase and behold in every nook and corner, grottoes and rustic seats, beautified by ferns and palms, and made musical by the singing of canaries and the cooing of doves; and then look down from the high gallery upon the wealth of tropical foliage and playing waters.

Dance in a ball-room that has walls of satin and a ceiling of solid gold; eat $1600 worth of terrapin from solid silver plates and every other luxury in proportion; drink the richest of wines ad libitum; walk through dozens of rooms, each of which is more beautiful than the other, and throw over everything the beauty and brilliancy of electric lights of every color and the richest elegance that money can buy, and then you will get an idea of the great event that has filled Baltimore with wonderment and admiration.

A CUBIC foot of gold weighs about 19,300 ounces, and gold is worth $20.67 per ounce. Silver is worth $1.29 per ounce, and a cubic foot weighs 10,500 ounces. Consequently the cubic foot of gold would be worth $398,931 and the silver $13,545.

TOBOG—OR NOT TOBOG.

Tobog, or not tobog—that's the question;
Whether 'tis wiser in a man to shuffle
O'er slides and slip-ups of uncleaned sidewalks,
Or to take sled against a hill of ice, sir,
And by a scoot-down, get there! To slide, to slip;
To soar; and by that slip reach the end,
The wind-up, and the thousand bruising bumps
That flesh is prone to—'tis a combustication
Devoutly to be dished! To slide; to slip:
To slip! Perchance to flop; aye, there's the rub;
For in that slip down hill what scrapes may come,
When we have scratched up all this mortal hide,
And skinned our paws; there's the respect
That makes calamity of that long slide;
For who would bear the cuts and smarts of coasts;
The steerer's wrong, the starter's stupidity,
The pangs of o'erturned loads, the crushed-up sleigh,
The twenty-five cents out, and the smarts
That patient merit bears when sweet girls snicker,
When he, himself, might his quietus take
Off a toboggan? Who would ride a sled
To scoot and grasp under a horse blanket,
But that the dread of not being fashionable—
That awful *bete noire*, from whose frown
No toboggan returns—masters the will,
And makes us rather take the hills we fear,
Than fly in haste from the toboggan slide!

—*Cleveland Sun.*

WINTER EVENING'S FUN.

Magic Table by which Ages can be infallibly told.

There is a good deal of amusement in the following table of figures. It will enable you to tell how old the young ladies are. Just hand this table to a young lady, and request her to tell you in which column or columns her age is contained, and add together the figures at the top of the columns in which her age is found and you have the great secret. Thus, suppose her age to be 17, you will find that number in the first and fifth columns; add the first figures of these two columns. Here is the magic table:

1	2	4	8	16	32
3	3	5	9	17	33
5	6	6	10	18	34
7	7	7	11	19	35
9	10	12	12	20	36
11	11	13	13	21	37
13	14	14	14	22	38
15	15	15	15	23	39
17	18	20	24	24	40
19	19	21	25	25	41
21	22	22	26	26	42
23	23	23	27	27	43
25	26	28	28	28	44
27	27	29	29	29	45
29	30	30	30	30	46
31	31	31	31	31	47
33	34	36	40	48	48
34	36	37	41	49	49
37	38	38	42	50	50
39	39	39	43	51	51
41	42	44	44	52	52
43	43	45	45	53	53
45	46	46	46	54	54
47	47	47	47	55	55
49	50	52	56	56	56
51	51	53	57	57	57
53	54	54	53	58	58
55	55	55	59	59	59
57	58	60	60	60	60
59	59	61	61	61	61
61	62	62	62	62	62
63	63	63	63	63	63

WAYS OF WOMEN.

Who Invest in Mines and grow Rich by Speculation.

A female speculator who is interested in Colorado mines was interviewed recently. On being requested to tell something of the women who have gone out west and made money, she said:

"I have been asked about ladies' prospecting. I have a lady friend who, while on a summer trip on the mountains, found an outcropping of ore on the surface aud located a claim which sold for $5,000. Mining for gold is a fine art, for in a whole ton of earth you will probably get no more than an ounce of gold, and that in such minute particles that one would need a microscope to find them. I have another lady friend who is a fine judge of ores and lives in a beautiful little cottage, with her husband. near some large mines that he owns. There is also a lady in Gunnison county who owns and works a large mine and gives it her personal supervision. She has her own home, where she boards the miners and tends them in sickness. My last year has been very profitable in a financial way, and I could have done nothing half so lucrative in any other business. Of course, I have bought my experience dearly, but I have spent a great deal of time in studying the matter up. I own mines in Eagle, Summit, and Boulder counties, and to people who understand mining districts, they are three of the best counties in Colorado for both silver and gold. Then I own one-fourth of a claim of a group of twenty mines called the Table Group, eleven of which are developed. The deed stands in my name and the mines are in the hands of London and New York firms. In these days, when all the professions are studied by ladies, hotels and manufacturies run by them, and even a steamboat license obtained by one of our sex, it seems to me that mining is one of the easiest of all these. The wealthiest woman in Colorado, Mrs. Bishop Iliff Warren, made her own money, and is now worth $10,000,000. She made her money on cattle. Ladies are too apathetic, and are bound down by conventionalities, and we are too often kept back by advice from the men of our families, who are always egotistical enough to think they can make enough. The women of Chicago and New York deal in stocks, in wheat. oil and consols, and why not in mining stocks?

JEWS AND JEWELRY.

A Lecture in Chickering Hall by the Rev. J. Everist Cathell.

Recently, a lecture was delivered in Chickering Hall, New York, by the Rev. J. E. Cathell of Oneida, New York. His subject was "Jews and Jewelry." He spoke of Genesis as the first written record of human activity, written when the art of writing as well as the science of arithmetic was in its infancy. He showed that the value of gold, onyx and pearls was known even at that time, and that working in brass was a well-developed trade. He drew attention to the etymological coincidence between the derivations of "Jew" and "jewelry." The proper name came from the name of the tribal ancestor Judah and signified a joy, a thing of delight and pleasure. Jewel came through the French and Italian from the Latin word "gaudium," or "joy," and appeared in other times as "joyel." This odd relation might have no deeper significance, but the speaker thought it at least an interesting fact.

Mr. Cathell told of the education which the Jewish nation acquired during their long bondage in Egypt, at that time pre-eminently the land of culture and high art. Working as slaves for their masters, they secured a knowledge of stamping, of metal work, of engraving and of architecture which was of the highest advantage to them when they departed from Egypt, abandoned their nomadic habits and became the permanent population of Palestine. How well this skill in the trades and mechanical arts served them is shown by their sacred paraphernalia and the temple they erected. Mr. Cathell denied in a cogent argument the possibility of a common or kindred origin of the Egyptian and Hebrew religions. He spoke of the impressive fact that while in all other ancient religions their golden age lay in the past, that of the Jews lay in the future. The Jews of to-day engaged his best attention, and he told several interesting anecdotes of the Hebrew love of brilliant jewels and of their thrifty and acquisitive nature. He closed with this tribute:

They are not a whit behind any citizen in all that goes to make good, intelligent and useful manhood. And yet there has uprisen to confront them a spirit, not of fear, but of ill-affected loathing. It has expressed itself in terms and manners, and inhibitions and prohibitions which ought to arouse in every true-hearted American a sense of indignant shame, and then to be formulated in severe rebuke to any who dare to wound the feelings of a race whose only offence is that they are the lineal descendants of heroes, martyrs and sages of long ages ago. Their traditions and exploits are all to be gathered up and formulated in that most unwarrantable prejudice against a Jew. Let us judge calmly of all men, and if we thus judge we shall find reason to admire this ancient people as connoisseurs would admire a gem whose record is of the remotest past, whose lustre is undimmed by the flight of five millenniums; and even if there should be found some bit of precious stone graven by the finger of Almighty God, it could not prove so precious in His sight as that solitaire among the races-that human intaglio of Divine handiwork, Israel—God's chosen!

THE modern craze for decoration has developed all sorts of quaint fancies. One of these is the decoration of an entire room with leather. Walls, ceilings and furniture are alike covered with stamped imitations of famous old Spanish tapestries, which the tanyard supplied the place of the loom in providing. The effect where gilding and color are applied is very rich, although somewhat tending to sombreness and monotony. The happiest application of this form of decoration is undoubtedly found in libraries, where dark wood-work and well-filled book-cases afford variety. Japanese leather paper is often made to do duty for the genuine material with excellent effect, and a very delusive imitation of leather is also manufactured in this country for the same purpose. Especially gorgous—in fact, too gorgeous—effects are produced by some decorators who use floral or allegorical panels painted on stamped paper with a gold ground. But such a kind of decoration is aggressive in forcing itself upon the eye, and the walls of a room paneled in this style seem to close in around one and become oppressive.

AMBER.

Pertinent Points Regarding the Value and Use of the "Gum Stone."

There is a peculear charm about the golden "gum stone." It carries one back to the days when they were "forest primeval," where man never trod. It shows that beyond the stormy Baltic there was once a land of Titanic woods. When the land sank beneath the sea the gum or rosin which had dropped like tears from the pre-historic firs had power to resist the ceaseless motion of the waves after the wood of the trees had decayed. Thus it is that the amber is found at the bottom of the sea or on the sandy shore. There is a difference of opinion as to the value of amber. In America the clear amber is considered the more valuable, while in Europe the cloudy sort commands the highest price. The greatest quantity of amber is found in the Baltic Sea, and it is also of finer quality than that found in other places. It posesses a magnetic quality which causes it to attract small objects when it is rubbed. For ages it has been considered in Arabia a talisman agains the evil eye; and in Northern Italy, if worn about the throat, it is said to be a preventive of the terrible goitre. Many persons in other lands also believe that a string of amber beads worn close about the throat will prevent the many ills of which cold is the cause. "The extreme warmth when in contact with the skin and the circle of electricity so maintained," one authority says "substantiates this opinion." Amber is the favorite incense of the Buddhists and Mohammedans. When burned, the fragrance is that of the fir or pine. The German word for amber, *Bernstein* (burnirg stone), has been derived from the readiness with which it burns. All the ancient writers speak of amber as a precious gum. The earliest Etruscan jewelry consisted of carved amber, which was called lynx stone, as it was supposed in some way to belong to the lynx. On one occasion Nero had the entire amphitheatre adorned with amber. All the weapons and other articles were made of it. The use of amber for the mouthpiece of pipes and cigar-holders originated in the East, where the pipe, like the calumet of the American Indians, is a social institution. The pipe was passed from one to another, and as amber was supposed to be a prophylactic against poison, no fear of treachery existed, it being impossible to convey poison by this substance. It is doubtless owing to its perfect cleanliness and non-absorptive property that it is used more extensively each year by smokers. It is said that an Arab woman will never give up her amber beads except for a sum of money far in excess of their market value. She will part with her children with scarcely a pang, but to unstring her precious amber necklace, unless for gain or through fear of a castigation from her lord and master if she does not comply with his commands, is something unheard of.

ODD THINGS IN SILVER.

Queer Forms Assumed by Molten Silver Dropped on Cold Slabs.

Ten years ago this winter I stood in the big California stamp Mill at Virginia City, Nev., watching the sixty ponderous 250-pound weights thundering on the quartz. The pulp was being stirred in the great pans; the tailings were going out down a flume like a mill race. At each settling pan was a large canvas bag held in a vise like grip. I was invited to thrust my hand into one of them. I did so and brought up a great handful of something that was heavy and as elusive as quicksand.

"That," said Senator Fair, then superintendent of the Big Bonanza mine, "is amalgam-quicksilver and gold and silver. We put that in red hot retorts. The quicksilver passes off in vapor, is caught and precipitated, and the bullion comes out in a blackened but solid mass. Now come down to the refining room and I'll show you something. D'ye ever see how silver spreads when you drop it? I can't do this as well as I'd like to, for there's too much gold; this stuff runs 45 per cent. gold. and it's too heavy to work as I'd like it."

Senator Fair led the way to a room in a brick building adjacent, where two great cauldrons were boiling and bubbling. "There's half a million in each of those," said Mr. Fair. "Johnny, clear this iron table, and get me two blocks of ice."

The ice was brought, and the blocks were placed a foot apart on the iron bed. When all was chilled Mr. Fair said: "Give me a fifty ounce ladle." The latter was dipped into one of the caldrons and came up with a pint of white, molten fluid. "Now watch," said Mr. Fair. He held it up as high as his arms would reach and dropped it on the cold slab between the cakes of ice. He dropped it in splatches of little more than a tablespoonful each. The effect was marvelous, As the liquid silver and gold fell, its weight scattered it into 10,000 conceivable shapes, and the cold chill so suddenly applied congealed it into a hundred thousand inconceivable shapes in an instant. There were splatters and splatches and all sorts of things. Where a single drop would fall, it would expand to either a coach wheel or a cobweb, as the freak would take it. If Mr. Fair dropped a spoonful next the cake of ice the splashes would rise, catch on to the ice and make a perfect little wire forest. It was one of the most beautiful sights the writer had ever seen.

"Jewelers and silversmiths," said Mr. Fair, "get a good many of their ideas from just such idiosyncrasies of silver bullion. I have held it up before now, dropped it and seen come out the oddest and most surprising forms. Lon Hamilton, Jones' brother-in-law, has a complete coach and four and hounds behind—the result of just one splatch on a cake of ice down at the Belcher. Odd things in silver? Oh, the silversmiths are more perfect than we are, but I'll bet I can hold this ladle up, drop the whole of it on that cold slab and you will see a variety of forms, devices and grotesqueries such as you never dreamed of. Johnny, give me a fresh ladle. Now, stand away. Here she goes" and a pint of molten silver went out on the cold iron.

Ten thousand shapes and ill shapes, and ten other thousand forms were there. There were forests and streams, and birds and reptiles, and rocks and mountains. To have picked out all would have been a week's task.

"Chuck it back into the pan," said Mr. Fair. "Give me another ladle. Now, watch this!"

Down it went on the cold slab. There were elephants and giraffes, and lions and dogs, and African bungaloes, and on one splatch a marching regiment could have been made out by but a trifling stretch of the imagination.—*Chicago News.*

THERE was a new opera and a new necklace for New York fasbionable people to see the second week in January. The opera was "Merlin," and it was well enough in its way, The triumphant article was the famous string of pearls which had once belonged to the Empress Eugenie and been worn by her in the days of the French monarchy. Even in those days of royal glitter in Paris this jeweled thing shone so brightly as to dazzle beholders accustomed to lavish adornments. It consists of 346 Oriental pearls, set in a golden chain, and it was valued then at $150,000. Napoleon's widow put it into a safe deposit vault in Paris on her retirement to Chiselhurst, and there it lay until the recent sale of her useless effects. Wm. K. Vanderbilt and his wife were in the French capital, and they purchased it at $130,000. They bought other things from the Eugenie collection—mostly household embellishments. Mrs. Willie Vanderbilt put on the necklace for the opera. It was warn across the top of her head, thence down the back of her coiffure to her neck, which it encircled, with enough left to hang down on her bosom. Not a singer on the stage, and hardly a danseuse, commanded so many glasses as did Mrs. Vanderbilt and her necklace.

SANDAL WOOD, so valuable here, has some queer uses in Japan. Passing a shop you see cords of wood cut into small blocks about six inches long. This you learn is nothing short of shoe-timber. These cords of wood will speedily be converted into shoes of various sizes, at prices ranging all the way from four to twenty cents. One feels quite exalted in a pair of twenty cent shoes. The wood is called kiri, and is very bright. The clogs are still further lightened by hollowing out the centre. So, in point of fact, there is little truth in calling the shoes heavy, although they appear so to the inexperienced observer. It must be admitted, though, that they are unreasonably clumsy. Sometimes the shoes worn by the ladies are lacquered, and are fastened by a velvet band passing from either side over the lower part of the instep, and between the first and second toes. With this same kind of wood are made bureaus provided with strong iron handles, and the whole box is adjustable in horizontal sections, one piled above another. Owing to the lightness of the wood these boxes may be filled with clothing and carried off on the shoulders of the coolie in case of fires, which so often vex the people of Tokio.

ADVERTISEMENTS.

ADVERTISING rates for column, double column, quarter page, half page, and full page advertisements furnished on application at this office, or to our advertising agents, E. A. Story & Bro., Lock Box 893, Philadelphia P. O.

THE KEYSTONE has the largest circulation of any journal in the TRADE.

THE KEYSTONE reaches every Jeweler in the United States and the Dominion of Canada.

ADVERTISERS say that it is the best medium to reach trade that they ever saw

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ADVERTISEMENTS under the heads FOR SALE—HELP WANTED—WANTED and SPECIAL NOTICES are three cents for each word, and no charge less than twenty-five cents.

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THE KEYSTONE,
19th and Brown Sts., Phila., Pa.

WANTED.

NOTICES under this head, three cents for each word, no Ad. less than twenty-five cents.

WANTED—WATCHMAKERS ALL OVER THE U. S. to send their overwork to CHAS. REISS, wholesale jeweler, 31 and 33 S. Pearl street, Albany, N. Y. Pivoting, 50 cents. New staffs, 75 cents to $1.50. New cylinders, $1.25. Excellent mechanics employed. Special dispatch. Established 1869. Send for price-list, issued every month. Material and tools of every description at lowest published catalogue prices.

WANTED—Jewelers to know that 15c will get sample of best 18k gold solder ever used. Flows easy on 10k and will not show. Address Frank Thompson, manufacturing jeweler, New Castle, Del.

WANTED—Every watchmaker in the U. S. to know where he can send a job of difficult or complicated watch repairing. Also jobber in Elgin and Waltham material. Chas. S. Crossman, 61 Nassau St. N. Y.

WANTED—A set of jeweler's rolls. Second-hand. Must be cheap. S. H. H., this office.

SPECIAL NOTICES.

NOTICES under this head, three cents for each word, no Ad. less than twenty-five cents.

CHAS. E. BILLINGS, WATCH AND CHRONOMETER repairing for the trade. Difficult and complicated work a specialty. 71 Nassau street, N. Y.

WANTED—JOBBERS AND MANUFACTURERS OF jewelry to keep me posted in bargains in their line. Spot cash paid for any approved bargain. J. W. SCHRIMPF, watchmaker and jeweler, Spirit Lake, Iowa.

CHAS. S. CROSSMAN, watch and chronometer maker for the trade has one of the largest and best equipped watch repair shops in the U. S., and is making a specialty of fine and complicated work for the trade. Correspondence solicited. Estimates furnished. 61 Nassau St. N. Y.

FOR SALE—AT 20 PER CENT. DISCOUNT, WATCHmaker's and jeweler's materials, optical goods, silk guards, Swiss tools, etc. Prices can be taken from any dealer's catalogue. Satisfaction guaranteed. CHAS. D. HAWKINS, 671 Eight Avenue, New York City.

WORTH $5.—ON RECEIPT OF 25 CENTS I WILL send to any address a receipt that will positively preserve the color of the most delicate stones or pearls, while hard soldering rings or other jewelry, without removing set. J. L. ACKERMAN, Lowell, Ind.

DON'T SEND NOW, BUT WAIT UNTIL THE OCCAsion arises when you can see just how you might have saved a quarter and kept your customer. Then send 25 cents for a perfect cement which will make open-face crystals dust-proof. Also enable you to turn out a good job when glass that you can just force in is loose, owing to undercut of bezel, or when your nearest size is a trifle small. CHAS. WEBER, Hackettstown, N. J.

50 CENTS IN POSTAL NOTE OR STAMPS SENT TO W. S. L. FREAR, Manufacturing Jeweler, Union Springs, N. Y., will insure your receiving by return mail one bottle of prepared flux, a new discovery for gold and silver soldering, enough to last you one year, and far superior to borax or anything of the kind, and one sample each of the best gold and silver solder you ever used. Also send for selection package of "Jersey or Ribbon" pins. Original, gay, and cheap. Every lady in the land wants one.

CHAS. S. CROSSMAN, watch and chronometer maker for the trade. High class work at moderate prices. Complicated watches a specialty. Also jobber in Elgin and Waltham material specially selected to fit. 61 Nassau St. N. Y.

CHAS. W. HOPKINS—Gold, silver, letter and ornamental engraver. First-class work. Lowest prices. Special terms for steady patronage. 339 Washington St., (Room M), Boston, Mass.

SEND 50cts. (postal note) to "The Jeweler," Baldwin, Lake Co., Mich., and get by return mail the "Boss" receipt for cleaning clocks without taking apart. It will clean the dirtiest clock in 5 minutes at the cost of one cent

NOTICE—Send 50 cents to J. P. Roarig, Edwardsville, Ills., and he will send you a tool with which you can turn any hair-spring without removing the balance cock, and also one which is between the balance and roller-table. Also a receipt for tempering drills hard enongh to drill a hole through a stubs finest file without drawing the temper.

LOOK HERE—Something needed by every watchmaker. A tool for flattening and trueing up twisted hair-springs By the use of this tool the worst coned and twisted hair-spring can be instantly made as true and flat as when it came from the maker. Substantially made of solid nickel and steel, is handsomely polished and finished. Will last forever. Price by mail, post paid with full directions, 85 cents. Send money, P.O. order, postal note, or registered letter. Stamps not taken. F. K. McMann, Jeweler, East Bloomfield, N. Y.

I WILL SEND C. O. D. to any address, a first-class silver solution, at $2 per gallon. For electro plating, gold-gilt solution, $2 per quart. Copper solution, fifty cents per gallon. Full direction for using sent with each solution. D. H. Gosnell, Box 128, Broadway, Ohio.

SEND ALL WATCH REPAIRING WHICH YOU CANnot find time to do yourself to CHAS. E. BILLINGS, 71 Nassau st., N. Y.

DIRECTIONS for gilding old watch movements; gilding on steel; gold and silverplating without a battery; gilding and silvering paste; electro-gilding and coloring gold; coloring for soft solder; anti oxydizer, jeweler's cements; how to make fine soft solder; hard solder; soldering fluids; cleaning fluids, etc. 90 practical and useful receipts. All for 50 cents postal note. H. L. Lawson, Moline, Ills.

FOR SALE OR EXCHANGE.

NOTICES under this head, three cents for each word, no Ad. less than twenty five cents.

WANTED TO TRADE—A HOTEL FOR $4500 WORTH of watches, clocks, and jewelry. Hotel is good renting property, and fast doubling up in value. J. W. SCHRIMPF, Spirit Lake, Iowa.

FOR SALE OR EXCHANGE—A No. 3 Seth Thomas regulator for a second hand engraving machine. C. W. Bollinger, Oskaloosa, Iowa. Box 80.

FOR SALE OR TRADE—About $200 worth of jewelry and silverware. Also one carved iron 12 inch dial watch sign and a walnut case for repair watches. Address W. H. Heater, St. Paris, Champaign Co., O.

WOULD EXCHANGE—A business stock and fixtures, about $15,000, in one of Canada's largest cities, not surpassed for business, health, or beauty of size on this Continent, for similiar business or real estate in the United States. M. A. Exchange, this office.

WILL exchange Lakeside camera box with 4 gem lenses, 1 Darlot lens, head rest, chair and lot of photo materials, all new, for American lathe. M. Wollman, Council Bluffs, Ia.

FOR SALE OR EXCHANGE—1 Evans rifle, 26-shot 44 cal. Cost $20 Used 1 year. Will take $15. 1 American knitting machine. In good order. Cost new, $25. Will take $12. Or will exchange both for American or Whitcomb lathe with attachments. N. E. Hull, Bear Lake, Michigan.

FOR SALE OR EXCHANGE—A good paying jewelry store Only one in county seat. Will sell on easy terms or exchange for a small farm near a city. Well improved fine store and dwelling combined, will sell or rent low. Lock Box G, Scottsburg, Ind.

FOR SALE OR WILL EXCHANGE—98 acres of land in Pulaski County, Indiana, for stock of jewelry, watches, Clocks, and silverware. J. W. Stark, jeweler, Jacksboro, Tex.

FOR JEWELRY—A farm, (healthiest country in the world), 50 acres under cultivation. $10 per acre. Horses and machinery, $2500. Part cash or exchange for good jewelry or goods. Write for particulars. Box 13, Sanborn, Barnes Co., Dakota.

WILL EXCHANGE traveling case with lock, velvet lined trays, and lot watchmaker s tools for good watch or other goods. For a bargain write to D. B. Shultz. Clinton, Ky.

FOR SALE OR EXCHANGE—40 acres good farming land, 30 acres cleared. Good log house. River across corner of land. Will sell for $150 cash or will trade for American lathe, balance in jewelry or optical goods. If you have anything in the jewelry line to trade write to G. B. Blood, Baldwin, Lake Co., Mich.

FOR SALE.

NOTICES under this head, three cents for each word, no Ad. less than twenty-five cents.

FOR SALE—A LONG-ESTABLISHED GOOD PAYING watch business. No stock. All ready for work. Good shop. Nice fixtures. Will sell very cheap. For particulars, address with stamp, J. ENDER, Fort Gaines, Ga.

A GOLDEN OPPORTUNITY—FOR YOU TO STEP into a big-paying jewelry business. Engaged in other business. Will sell our jewelry store in town of 3000 population, in Missouri. County seat. Only one other store in the county. Doing a good paying business. Beautiful location. Don't write unless you mean business, and have a thousand dollars in clear cash. State distinctly, what you can do—when you can do it. Will reply in like manner. Stock is clear and fresh, and will invoice $3000. STRICTLY BUSINESS, this office.

FOR SALE—Jewelers Ring Rolls, 2x4, seven sizes, two handles, $25. Also Marine Chronometers (second hand) in good order, from $65 to $75. Chas. F. Trube, Galveston, Tex

FOR SALE—A rare opportunity for a good watchmaker and jeweler in a prosperous town of Mass.; population 10,000; only one other jeweler in town; small, clean Stock and Fixtures; good location; $600 cash buys it; present owner going out of business. Address Post Office box 380, Adams Mass.

FOR SALE—A jewelry, book, and stationery store in one of the best towns in Central Dakota. Business about $10,000 per annum. No competition, fine location, and low rent. Good reason for selling. Stock will invoice about $2500. Half cash, balance 6 months' time. No old stock. Will sell residence property also. Dakota, this office.

FOR SALE—Some territory of a useful household article. 30,000 sold in Illinois alone. $20 in one hour, made by one agent. A scheme to make some money. Box 22 Hammond, Ill.

FOR SALE—Stock drugs, notions, and small line of jewelry, A good repair trade built up 10 miles to nearest drug or jewelry store. On B & O. R. R. direct with Chicago, and Toledo. Reason for selling, want to go west. Invoice $1300 E. J. Potter, Sherwood, Defiance Co., Ohio.

FOR SALE—Jewelry business in a fine Nebraska town. Population 600. Good game country. Stock and fixtures $500. Address Box 96, Wakefield, Neb.

FOR SALE—A good paying jewelry store, established 18 years on leading thoroughfare in Brooklyn, N. Y.; owner has other interests that needs his attention; or would take responsible party with capital as partner. Address Jewelry Store, care of The Keystone.

FOR SALE CHEAP—A first-class electric machine with type and battery complete. Address Lock Box 560 Kewanee, Ill.

BEST OFFER YET—$4000 stock consisting of clocks, watches, jewelry, silverware, cutlery, musical instruments, etc. 75 watches on the rack now. Plenty of work, light position. Will reduce stock one half if desired. Must sell by 15th of March. For particulars, address J. C Milliron, North Manchester, Ind.

FOR SALE—The chance of a lifetime. A fresh stock of goods, mostly American watches, in a New York town of about 1000 inhabitants. Rent low. Rooms over store furnished for housekeeping. No competition within 8 miles and established 10 years. Largest sales of any establishment in the county. Plenty of work for one man. Can double your money every year. Inventory about $1000, including fixtures. Goodwill worth $1000. Loss of manager, reason for selling. Address Miss Martha Springsteen, Milford, N. Y.

FOR SALE—Francis engraving machine with type, in complete order, but not now in use. Also one grandfathers, sweep-second, moon changes, eight day clock, over 100 years old, in first-class order. Address C. A. Kolter, Shrewsbury, Pa.

FOR SALE—Stock fixtures and goodwill, with tools if desired, of jewelry store for $1000. A place of 20,000 in Eastern Pennsylvania. Only one other jewelry store. Address "Penn" this office.

FOR SALE—Model card press, complete self-inking, chase, 3¼x5¼ inches. Cost $13. Good as new Sell for $9 and ship at once. Address S. D. Forrest, Jeweler, Covington, Pa.

A GOOD paying jewelery store in N. Y. Busy neighborhood. First-class chance for a good watchmaker. Stock, fixtures, and goodwill $1000, Will sell or keep stock. Going to leave country. Address "B. L." this office.

FOR SALE—A stock of watches, clocks, jewelry, etc. in a thriving county seat in Kansas. Will invoice about $1500. Will discount for cash. Health will not permit me to continue. Good run of sales and benchwork. Address "Kansas" this office.

FOR SALE—At a bargain, the best jewelry business in Denver, Col. For particulars, address P. O. Box 2119, Denver, Col.

FOR SALE CHEAP—A set of black velvet lined jewelry trays, good as new, for 8 foot show case. H. E. Buckmaster, Augusta, Kas.

FOR SALE—Fine chance for new beginner. A jewelry store. Town is county seat. No opposition in repairing. Enough for one and sell to large surrounding country. Stock well selected. Will invoice $250. Fixtures, $50. Address Hugh Simpson, Clinton, Kentucky.

FOR SALE—The best located jewelry store in the village of Cortland, N. Y. Low rent, clean stock, and good run of work. Invoice about $5000. Satisfactory reason for selling. Lock Box 260, Cortland, N. Y.

$1000 CASH will buy a jeweler's business that paid $1500 profit last year. J. W. Wood, Calliope, Iowa.

FOR SALE—A neat jewelry store on Long Island, 43 miles from New York City. Stock in good order. Fine new set of tools and lathes, all complete. Established 5 years. Must be seen to be appreciated. Also a good type-writing trade connected and a first-class instrument. Best stand and no opposition. Call or write for particulars. M. W. Hawkins, jeweler, Islip, N. Y.

FOR SALE—In one of the best towns on the Chicago, Burlington, and Quincy R. R., one of the nicest little jewelry stores in the county. Good fixtures. Cheap rent. Stock and fixtures $15 to $18. Reason for selling, poor health. Address "K," this office.

FOR SALE—Stock and fixtures including 3 counters. 1 wall ebony finished and spectacle case. In live growing eastern Kansas town. 3 railroads, 2 just completed: 2 banks; roundhouse, freight division. Population about 1200 and increasing. Just stock and fixtures now invoice about $1000, Can reduce lower if desired. Best reasons for selling. Terms cash. Good repair trade. Address Lock Box 12, LeRoy, Kan.

FOR SALE—"Rare chance" for a practical workman to buy fixtures and as much stock as is desired at a bargain in a city of 10,000 inhabitants in Western Pennsylvania. Reasons for selling given Must be sold before April 1, 1887. Address "Bonanza," this office.

FOR SALE—Jewelry store. Cheap, if sold in next thirty adys. More work than one man can do most of the time. 35 miles from N. Y. 3300 inhabitants. Stock is at present light. No opposition of any kind. "R. H.," this office.

FOR SALE—Cheap. A jewelry store in city of over 3500 inhabitants, on line of two railroads, 40 miles west of St. Joseph Mo. Work enough for two. $50 000 water-works, machine shops, etc. now being put in. Stock and fixtures will invoice from $2000 to $3000. Will keep some stock if necessary. Established 10 years. Four 8 foot plate glass cases, new regulator, and large safe. Reasons for selling, going south for health. Address at once, Box 29, Hiawatha, Kas.

FOR SALE—57-inch bicycle, made to order by Phila. Bicycle Co. Parts imported from England. Bowns Aeoles Ball Bearings; dropped handle bars; Victor saddle; wheels enameled; balance nickel plated. Lamp, tool bag, tools, bell, all complete $80 net cash. Chas. J. Pilling, 101 S. 10th St., Phila., Pa.

FOR SALE—A good chance for any jeweler who wishes to locate in a small, growing town, to carry small stock jewelry in connection with some other branch, or who wishes a change of business. Will sell stock and buildings, or buildings and lots. Good sized block on corner. Premises well adapted to hotel, hardware or furniture store., and excellent inducements here for either. Dwelling connected with store, and several other rooms rented. Address Jeweler, Melvin, Ford Co., Ill.

$600 WILL put you into a neat little jewelry and stationery store, established 6 years, in one of the best towns in Dakota. County seat. Good run of work. No competition. Reasons for selling: have to attend to the manufacture and sale of my patents. Patents, this office.

FOR SALE—A fine stock of watches, clocks, jewelry, and silverware, with tools and fixtures. No old stock. Business well established, and pays from $80 to $300 per month, clear profit. Plenty of work at good prices. Location healthy. Population 1500 and rapidly increasing. Pleasant society. 4 large churches. All desirable advantages and improvements. Large and fine college building, built last summer, cost $60,000. Two more railroads to pass through this place within 4 months. City lies in center of a rich farming and best broom corn producing county in the State. Can reduce stock to suit purchaser. Reason for selling and other information desired promptly furnished by Jeweler, Lock Box 14, Lindsburg, McPherson Co, Kansas.

FOR SALE—A good paying jewelry store. Established 18 years on a leading thoroughfare in Brooklyn, N. Y., or would take responsible party with capital as partner. Owner has other interests that need his attention. Jeweler, this office.

FOR SALE—An old established and first-class jewelry store. Good stock of staple goods and fine fixtures, amounting to about $6000. Will reduce stock if necessary. Located in one of the most desirable villages of 5000 inhabitants in western New York. Reason for selling: wish to retire from business. D. E., this office.

FOR SALE—John Stark American lathe, with universal head, slide-rest, 16 split chucks, counter-shaft, and lathe-wheel. All in good order. Price $60. Grohman, 203 State street, Bridgeport, Conn.

FOR SALE—1 rolling-mill, in first-class order. Plain rolls on pedestal. Price, $20. 1 rounding-up tool, with stumps and cutters. Used but little. First-class tool, Cost $40. Will sell for $25. 1 Swiss universal lathe, side geared, with back center, and all attachments, on stand. Good order. Price, $25. 1 black walnut show-case, 6 feet long, 2 feet high, 2 feet wide Price, $10. 1 Stark lathe, nickel-plated, 8½ inch bed, 4 inch swing. 6 wire chucks. Diamond lap. Patent wax. Several large chucks for case work. In good order and with Hopkins compound pivoting chuck. Cost $16.50 fitted. Without Hopkins chuck, $28. All complete $35. Cost, $60. Any one of these will be delivered free on board of cars properly boxed, upon receipt of cash. M. L. Springsteen, Milford, N. Y.

FOR SALE—A small jewelry store and good will. Stock and fixtures invoice $8000 to $9000. Write for terms. W. A. Townsend, New Madison, Ohio.

FOR SALE—Staking tool, like new, with fine roller remover. 24 nickeled punches. High stand. Jeweler, Alvira, Pa.

ATTENTION!—For sale, a paying jewelry business in large city in Northwestern Ohio. Stock, fixtures, and 6000-lb. safe will invoice about $1500. Part cash and balance on long time. Will take partner who must do bench-work, as my eyes prevent me doing it. Or will trade for some other business in which the straining of the eye is not required. This is a rare bargain for a man to go in a well established business with a small capital. Pivot, this office.

FOR SALE—To close out, about 1000 1-day clock springs, $3.50 per 100. 10,000 pairs assorted clock hands, 50 cents per 100 pairs. 2000 second clock hands, $1 per 100. 25 gross clock verges, assorted, $1 per gross. Terms cash with order. B. W. Bowen, Successor to U. S. Clock Co., Austin, Ill.

FOR SALE—Jewelry store, invoice about $3500. Will sell fixtures without stock if desired. One of the best towns in New York State. County seat. Large railroad and commercial centre. R. Beachman, Lyons, N. Y.

GRAND OPPORTUNITY—FOR A GOOD, WIDEawake man. For sale, a first-class jewelry store, or two stores in two of the best manufacturing towns of the state of Ohio, only 4 miles apart. One has 5000 population, and the other 8000. These towns contain the largest and best factories in the state. For information and terms address ENTERPRISE, this office.

FOR SALE—On reasonable terms, a jewelry store. Doing a good business in a live town of 2500 inhabitants, in Southwestern Michigan. Location first-class. Rent low. Stock clean and not large. For further particulars, address C. B., this office.

FOR SALE—Stark lathe, with split chucks, wheel chucks, cement brasses, etc., all in good order. Also Universal head, jeweling tool, and slide-rest. Graver, this office.

FOR SALE—Two well established jewelry stores. One in Waxahatchie. Good town. 4000 population. 2 railroads, prospect of another one soon. One other jeweler in town. The other store in a good town about same size. Old established business. Bench-work average $100 per month. Will sell one or both places. Address E. I. Pittman, Ennis, or Waxahatchie, Texas.

FOR SALE—A jewelry store. Stock $2000. In a thriving town in Georgia. Store making money handsomely. Only object in selling: obliged to go into other business. X, this office.

FOR SALE—A rare chance for a good watchmaker wishing to go into business with $5000 cash. A business that pays from $4000 to $5000 per year profit. Bench-work $150 per month. Will rent store with all fixtures, need only to buy a clean stock of goods. If you have the cash and mean business it will pay you to write for particulars to Pennsylvania, this office.

FOR SALE—In a good growing town of 800 in Merrick Co., Nebraska. jewelry stock, fixtures, and good will. Will invoice $1000. Good repair trade. Have a good building, will sell or not to suit purchaser. Reason for selling; wish to engage in business with a friend. Nebraska, this office.

FOR SALE—A fine opportunity is offered to buy out a well established jewelry and stationery business. Located in a town of 1500 population, (2 railroads), in Eastern Nebraska. Address for particulars G. W. Marquardt & Sons, Des Moines, Iowa.

HELP WANTED.

NOTICES under this head, three cents for each word, no Ad. less than twenty-five cents.

WANTED—A FIRST-CLASS WATCHMAKER AND jewelry repairer (one who can engrave preferred). Good salary and permanent situation to a good man. Must have good references. E. P. LEDOUX, Box 492, Silver City, New Mexico.

WANTED—A practical watchmaker, jeweler, and engraver. To the right party, a permanent position and good wages. Address H, care of Wheeler, Parson & Hays, 2 Maiden Lane, New York.

WANTED—At once. Good watchmaker and engraver, and first-class salesman for Wisconsin. A 1. ref. given and required. Will furnish tools. Address, stating wages. "Wisconsin," this office.

WANTED—A practical watchmaker, to whom I can give a bargain in a booming Nebraska town, termination of railroad. A neat new stock of watches, clocks, and jewelry. Bench work runs $60 per month. $200 to $300, all the cost required. A grand opportunity. Address "Nebraska:" this office.

WANTED—A manufacturing jeweler and repairer. One that can cut for and enamel emblem jewelry. Permanent work for the right man. L. D. de Mars, Minneapolis, Minn.

WANTED AT ONCE—A first-class German watchmaker. Single. Good salary and permanent situation to the right man. E. Bechert, Corpus Christi, Texas.

Keystone Watch Case Co.

Makers of
HIGH-GRADE WATCH CASES

Brands: Keystone Solid Gold; James Boss Filled; Keystone Solid Silver; Leader Silver; Silveroid

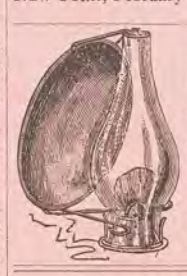
CARD TO THE TRADE.

Owing to the fact that my Marine chronometer business has grown to such proportions that it requires my whole time and attention, I hereby announce that I have transferred my watch-repairing and adjusting for the trade outside of New York City, to Mr. Chas. S Crossman, of 61 Nassau street, this city, who will continue the same at that location.

His long practical experience, well eqnipped shop, and able staff of first-class watchmakers, enable him to fully maintain the high standard of workmanship to which I have given special attention for the past 45 years.

H. H. HEINRICH.

NEW YORK, February 8, 1887.



FOR SALE OR TRADE—THE U. S. patent No. 278,610, of Seele's reflector for lamps. Useful to any family that has a common coal oil lamp. Will take $300 cash or trade. Sample by mail 15 cts. HENRY SEELE, Jeweler, Rolla, Mo.

SITUATIONS WANTED.

WANTED—After Feb. 15, 1887, I will be open for an engagement as traveling salesman for a wholesale jewelry house, am acquainted with trade in Kansas and part of Nebraska. Address Lock Box 557 Atchison, Kansas.

WANTED—Situatien by a married man of 28 with 10 years experience at the bench. Good ref. Address W. H. Heater, St. Paris, Champaign Co., O.

WANTED—Situation to finish trade or as book-keeper, by a young man 21 years of age. Had a year's experience at the bench, and two years' as book-keeper and salesman. Can keep single and double entry. Graduate of Dixon business college. Good references F, Box 562, Stevens Point, Wis.

WILL take any position of trust. Can give security if required. 14 years' experience at the bench and counter. Will not take less than $20 per week. Can give best references. Present engagement expires September 15, '87. Correspondence solicited. Thos. Wilson, Dundas street, London, Ontario.

BY a good watchmaker and engraver, with a full set of tools, Whitcomb lathe, etc. 11 years' experience at the bench. Speaks German. Watchmaker, this office.

BY young man of 13 years' experience in retail store, as salesman in a wholesale or retail store in a large town or city. Reference or security. H. H. Webb, Mt. Joy, Pa.

AS manager in a jewelry store, as far south as Richmond, where fine watches are made a specialty. Understand watchmaking and adjusting. Age, 37 years, with 15 years' experience. Best references given and required Do not drink, smoke, or chew, and would not care to work for a man who drank. D. E. Saxton, Milford, N. Y.

IN a good lively town or city in a jewelry store. Have had 6 years' experience. Can furnish all tools including an $85 engraving machine. References as first-class salesman and workman. M. L. Barnard, Box 355, Fowlerville, Mich.

BY a watchmaker who thoroughly understands the business. Can do engraving. Can furnish best references. J. A., Plano, Ill.

BY a young man, aged 21, to finish his trade as watchmaker. Have had 3 years' experience. Best references. Henry H. Bishop, 4213 Wentworth Avenue, Chicago. Ill.

BY a first-class watch repairer and jobber a situation. Can furnish fine set of tools. Good salesman, and can take full charge of business if required. Age, 29. 12 years' experience at bench. Best references given. Jeweler, Box 109, Garrettsville, Ohio.

SITUATION WANTED—BY A FIRST-CLASS WATCHmaker. In Ohio if possible, but elsewhere if need be. 24 yers of age. Worked at trade 11 years. GOOD WORK, this office.

WANTED—SITUATION BY YOUNG MAN 25 YEARS old. First-class watchmaker. 11 years' experience. Anywhere in the U. S. COMPETENT, this office.

WANTED—SITUATION BY YOUNG MAN 22 YEARS of age, to act as traveling salesman or advertising agent for some good firm handling light goods. Have traveled some west of the Mississippi River. Good habits and references. W. H. LAPHAM, 35 First Avenue, Cedar Rapids, Iowa.

SITUATION WANTED—I AM IN WANT OF A POSItion as watchmaker and jeweler. Can do Engraving. Am a young man. Have had 7 years' experience at the bench, and am a good salesman. Good references. WATCHMAKER, Box 252, Shelbyville, Ind.

WANTED—SITUATION BY YOUNG MAN 21 YEARS old, with good watchmaker to finish trade. Have had 5 years' experience in book and jewelry store, part of time at the bench. Can do clock work and engrave. MARK E. BOGART, Wilmington, Ill.

WANTED—CHARGE OF THE TOOL AND METAL departments of some good house. Experience and good references. Industrious, sober, honest, and capable. Box 216, Kennet Square, Pa.

WANTED—SITUATION BY A WATCHMAKER AND jeweler. Will furnish his own tools, and give satisfactory references. Is not an engraver. O. F. P., this office.

A YOUNG MAN 19 YEARS OF AGE, WELL QUALIfied in the optical business, would like to take a situation in a jewelry store to attend to the optical department. In part pay, would learn the watchmaker's business. Can adjust glasses correctly for asticmatic trouble, and impaired eye sight. D. M. SCHWAB, Optician, Trenton, N. J.

SITUATION WANTED—BY YOUNG MAN 19 YEARS of age. Has had 2 years' experience at the bench at watch, clock, and jewelry repairing. Minnesota preferred. Address stating salary and particulars, C. F. LEWIS, Spring Valley, Minn.

WANTED—SITUATION BY YOUNG MAN 19 YEARS old (California preferred). 3 years' experience as a general repairer of watches, clocks, and jewelry. Has a Moseley lathe and attachments. Can also do plain engraving. Low wages. V HUNZIKER, Cloverdale, California.

SEE HERE!—I AM DESIROUS OF OBTAINING A good, permanent situation at once. Am 27 years old, married, and have been 14 years at the bench. Can do all fine watch, clock, and jewelry repairing; also engrave some. Fully understand my business. References given and required. PIVOT, care D. C. Beckham, Zebulon, Pike Co., Ga.

THE KEYSTONE

A monthly journal for the Trade, published at Nineteenth and Brown streets, Philadelphia, price 25 cents a year, in advance.

Circulation 15,000 larger than that of any other journal of its class, reaching every jeweler in the United States and Canada.

Address all communications to

THE KEYSTONE,
ROBERT W. ROBINS, Publisher,
Nineteenth and Brown streets,
Philadelphia, Pa.

The Keystone.

PHILADELPHIA, FEBRUARY, 1887.

AT the KEYSTONE office the past month has been a busy one. Over five hundred new subscribers joined the army of patrons who will march under the KEYSTONE banner during 1887, and, as one correspondent enthusiastically says "as long as the old flag flutters in the breeze." Advertisers are waking up to the value of the KEYSTONE as a medium to reach the trade, and our columns are fast filling up with crisp, new advertisements. The correspondence attached to this branch of the business is no slight matter. Take it all in all, the past thirty days have been busy ones, and the results entirely satisfactory. If this thing continues, the KEYSTONE, only recently enlarged, will be compelled to spread itself again. To this end matters are gradually approaching.

EVERY day makes the fact more clear that the battle of 1888 will be fought on the revenue issue. The people will declare in favor of high wages and a home market on the one hand, or of pauper service and industrial depression on the other.

DURING the past six years, under a protective tariff, public securities to the amount of $720,000,000 have been paid off. Notwithstanding all this, the tariff-smasher, and free-trade crank is abroad in the land, and, worse still, is seated in Congress.

EACH month, according to the Poles, is under the influence of a precious stone—January has the garnet; February, the amethyst; March, the bloodstone; April, the diamond; May, the emerald; June, the agate; July, the cornelian; August, the sardonyx; September, the chrysolite; October, the opal; November, the topaz, and December the turquoise.

THE language of precious stones is, according to the ancients, as follows: The garnet, constancy; the amethyst, sincerity; the bloodstone, courage; the diamond, innocence; the emerald, success in love; the agate, health and long life; the cornelian, content; the sardonyx, conjugal felicity; the chrysolite, antidote to madness: the opal, hope; the topaz, fidelity, and the turquoise, prosperity.

HOW little regard free traders pay to facts was shown in a recent meeting in Cooper Institute, New York. One of the speakers declared that what the Sonth needs is free trade. It so happens that the only really prosperous towns in the South to-day are those which are being built up by manufacturing made possible by a protective tariff. But then such facts as these do not trouble the free traders.

HOME decoration is one of the healthiest forms that æstheticism has taken. A well ordered home is the greatest safeguard against lowering influences; and, if to comfort and order can be added the subtle teachings of beauty, results can be achieved well worthy of the effort. Every one knows houses where the rooms seem to smile, and this is by no means owing to elaborate preparation or expensive ornament. It is only because in them pretty things are valued, and bright effects produced by simple decoration.

PRESIDENT CLEVELAND, before election, pledged himself "to select as Federal officers for the territories citizens previously resident therein," according to the text of the Democratic platform. Since taking the office, of the five Governors appointed, all have been residents of distant States. Of the judges and other territorial officers, the majority came from the South, and are of the most pronounced type of rebel, Union-hating, Southern Democrats. In the territories, and among Democrats themselves, Cleveland stock is below par.

THE British Museum has lately acquired a splendid collection of Japanese wood-cut illustrations and picture books—a collection which is and must remain unique, and enables the ordinary sight-seer to trace the genesis, growth and progress of a series of schools of art, born and fostered entirely independent of European assistance and encouragement.

FOLKS YOU KNOW.

Mr. S. A. Rhodes, of Little Falls, N. Y., has on exhibition one of those square, self-winding watches that are such curiosities.

The KEYSTONE returns acknowledgements to W. S. Cornish, of Malone, N. Y., for photographs of his handsome store.

E. L. MC DOWELL, of the Crescent jewelry store, of Arkansas City, Kansas, issued a fine holiday number, in which the merits of Keystone and Boss Cases led the list of attraction.

THE Hagerstown, Md., *Daily News*, recently said, "Mr. Milton Kohler, jeweler, opened one of the handsomest stocks of goods on Saturday last in his newly fitted room that it has ever been our pleasure to examine.

THE Dillsburg, Pa., *Bulletin* says: "Last Wednesday N. R. Bailey, jeweler, erected a massive double-dlal town clock in front of his business. Mr. B. manufactured the entire clock and frame which reflects credit upon him for skill as a workman.

The Meyersdale, Pa., *Commercial* in a recent issue said: "Sol. Wile, one of our leading jewelers, leaves in a short time for Philadelphia, where he has secured a business house, and where he will go into the jewelry line extensively."

THE *Herald*, Lancaster, Wisconsin says: "The jewelry store of L. Vanderbie, Jr. was started in 1884. He carries everything in the jewelry line, gold and silver watches, silverware, clocks, spectacles, etc. He also makes a specialty of repairing. He lately opened a branch store in Potosi.

The *Free Press*, Great Falls N. H., recently said: "While in South Berwick a few days since we dropped into C. J. Tyler's jewelry and watchmaking establishment. Mr. Tyler has been established in business in South Berwick for twenty years, out-staying some eight or nine different parties, who have opened there only to close up again after a short struggle."

ALPHABET PLATES.

ENGRAVED SPECIMENS TO FACILITATE THE LEARNER'S ADVANCEMENT.

Examples in Formation and Cutting Different Styles of Letters—Ready Transfer Process.

In the last issue of the KEYSTONE, I was enabled, through the courtesy of the editor, to give my readers who are interested in the art of engraving, a brief outline of the various tools and appliances used in the engraver's workshop, together with a pictorial representation of the bench, with many of its accessories scattered thereon, in order the better to aid the learner to comprehend how the professional does his work, and the various aids he, from time to time, brings into requisition in his business.

I have hitherto laid much stress on the importance of the student who desires to learn engraving as a means of livelihood, or who wishes to exercise it in connection with the jewelry business, devoting his attention at the start to the correct formation of lettering, and of a clear, steady, facile mode of cutting what he sketches. These are fundamental topics upon which depends the learner's success in attaining a practical knowledge of the art, and are the chief points to which I direct the initial efforts of those who are placed under my personal tuition.

In connection with this subject, I have in various articles published at different times in trade journals, recommended various devices to aid beginners or those whose acquaintance with engraving has, through lack of opportunity to learn, never passed beyond the rudimentary stage, in forming designs to serve as models, or in sketching on metal plates for cutting, or transferring sketches thereon, and then executing with the graver what they have so sketched or transferred.

I may as well here state that I do not cordially approve of the transfer plan; but, as a method to facilitate the formation of letters, scrolls, ciphers, monograms, etc., on metal to enable the amateur or learner to readily and correctly prepare his subject for cutting, it has its advantages, and will probably never be dispensed with. Even those who are expert sketchers not unfrequently resort to this easy method of sketching by artifice, what would otherwise be a tedious and delicate operation. When a job has to be performed in a hurry, and when excellent models of what will just answer the purpose are at hand, there is a great temptation to employ the easiest means to accomplish the desired end. We would much prefer, of course, to see the expert engraver, who can deftly handle his boxwood marker or steel tracing point, design his subject in true artistic fashion, directly on the plate or article to be engraved; but it is not every one who has the ability to do this in a prompt and precise manner, and without devoting more time and trouble to a piece of work than the remuneration therefrom will warrant. These considerations render the transfer process of great utility and convenience to those whose time is valuable, or whose skill and ability are limited.

A pertinent query here presents itself in this connection: "What is the simplest, and, at the same time, most available method of transferring designs to the object to be engraved?" I have expressed my opinion on these matters very often in the plainest language I could use, and my explanations and instructions have been published, sometimes with illustrations, in text-books and journals. But as I here design to direct my readers' attention to a special device, I will not reiterate my former observations, but proceed to the point at issue.

I have already explained to my readers the use and facility of what has been termed "metal transfer type." I have recommended this invention to many of my learners and I supplied the type to several of my patrons, at manufacturer's prices, and they never seem to disparage its utility or complain of it being impracticable. The type in question is just as I represent it to be—an aid and a convenience to the learner, amateur, or practical operator, in getting designs, accurate us to size and style on the surface to be cut, thereby proving a ready substitute for manual sketching, Such a device does not, of course, promote originality or instil self-reliance, two very valuable qualities in the artist, which cannot be too strongly inculcated or assiduously developed.

The high price which this transfer type necessarily commands, being covered by patents, is also a bar to its common use. The young man trying to learn a business hesitates to invest $5 in a set of type which he is diffident of being able to use to advantage. I have had long experience in supplying engraving outfits to learners, some cheap and others high-priced, according to the sum which the student is able or willing to expend; but I find economy to be the prevailing consideration among those purchasing supplies. Of course, economy in purchasing such articles as engravers need is not always prudent or commendable, but sometimes the matter is one of necessity, and we must take things as we find them. A high-priced article, however useful or needful, will not find a ready sale even among those who appreciate it.

Sometime ago I devised a plan which close application to business hitherto prevented me from pushing to development. The idea arose from the exigencies of my own business, in the instruction of my pupils. I found that the latter learned more rapidly and gained a more correct impression of how work should be done from specimens of my own work on metal than by any amount of teaching or theoretical training. From my engraved specimens they observed how the work was laid out, with all the details of size, spacing, and other points, and also the manner in which the cutting—the main point—was performed; and this practical instruction was worth more than all the ordinary instruction bestowed on them. I accordingly utilized this preference by designing on metal plates, according to approved methods, and then cut those designs, making them observe each successive step in the process, till the work was completed. Then I placed the finished plate in their hands as an object lesson for their study and imitation, and always with good results.

I next conceived the idea of cutting alphabet series of letters, capital and lower case, with numbers and other figures, on plates of the usual kind, with copper surface, and supplying those who have not the advantage of a teacher's instruction or supervision. I believe such plates, with specimens of correct engraving, would prove a great boon to those who have to educate themselves with whatever extrinsic aid they can obtain.

Then a further improvement was suggested, whereby these plates can be utilized both as models and as means to accomplish the transfer process. Impressions taken from them by a simple and ingenious apparatus would be almost, if not quite, as good as those obtained by the type above referred to, at less than one-third the price of the latter.

With such examples as these in the amateur's hands, instead of the old-fashioned printed specimens in alphabet books, which show only the form and not the mode of cutting, I believe his progress would be rapid and easy; and by comparison with the specimen he could always see for himself whether his work was well and correctly done or not. This he could not ascertain from books of instruction. Telling a person how to do a thing is never as potent a mode of education as showing him how it is done. "Example is stronger than precept" is an old aphorism, and it holds good in art as well as in morals. By observation of these plates the learner's eye becomes trained and critical; his taste becomes cultivated and soon, by adequate practice, he is enabled to imitate the sketching and cutting furnished by his model better than he could by a long course of self-instruction. He learns to reproduce with his pencil the letters on his engraved plate, on a larger or smaller scale, according to the dimensions of the surface he wishes to engrave upon.

Now, for the transfer arrangement. I combine the two processes in the one apparatus for the sake of simplicity and economy. The transfer instrument is a little contrivance with a rubber surface by which you can readily transfer any letter or figure on the plate to a bright metal surface, to facilitate cutting and obviate the trouble and delay of designing. It may not be sound art, but it is a very convenient device to accomplish rapid work. You simply treat the letter you want to transfer to the usual preparation and in an instant you produce a perfect copy of it on the surface you wish to engrave; then by close attention to the way the letter has been cut on the plate, you can engrave it neatly and correctly in less time than it usually takes to sketch it. So, it will be apparent, the contrivance is not without its merits.

Most students are ambitious to handle the graver early in their career. They are anxious to learn cutting before they know much, if anything, else. This ambition may be encouraged provided they are taught to cut correctly. If not, their efforts degenerate into mere common-place scratching.

To give the student the proper impulse and train his efforts in the right direction is the object of my plan. A glance at the cut herewith presented will give some idea of how the process works. There is no secret about it; any one of ordinary ability can master the *modus operandi* after a brief experiment.

Jewelers who do their own engraving will probably be glad to avail themselves of this aid. They will find it a saving in point of time and useful as a model.

The cost is trivial. The engraved alphabet plate will be furnished for $1.25; postage, ten cents extra. Transfer instrument, twenty-five cents; postage, two cents.

At the risk of intruding on the patience of the editor, I would warn my correspondents who overwhelm me with inquiries about engraving and engravers' supplies, that however much I would wish to aid them in learning the art, life is too short and its cares too many to allow me to reply in detail to all their inquiries. It is only as a matter of convenience that I furnish supplies, as material houses do not furnish articles prepared for a learner or amateur. To be brief, my readers should state what class of work they intend to do; what tools they need, or what amount they want to expend, and I will furnish them a list with the articles suitable for them checked off. They will thus see how much to remit, and save time and trouble.

GEO. F. WHELPLEY.

TRADE TOPICS.

FIVE MINUTE CHATS ON MATTERS OF GENERAL INTEREST.

Ripples from the Stream of Correspondence That Has Been Flowing During the Past Month.

As indicated in the January number, this is a new department, in which will be gathered the matter specially interesting to the trade, such as the novelties of the season, and short bits of correspondence from all over the country. It is bound to be an interesting corner of the paper, and will soon break the limit of a single page.

GOOD CLEANING FLUID.

"Is there any liquid suitable to place a watch movement in, to clean it?" asks William Sedgwick of Waverly, New York.

Rectified benzine is the proper liquid to use to remove the dirt and dust quick from all parts. This liquid as well as sulphuric ether does its work very satisfactorily. After immersing and leaving the parts in a covered glass cup for a little while, they are dried off carefully with a soft cloth and they will appear bright and clean.

WANTED—A HAND-BOOK.

"Can you inform me where I can get a good watchmakers' hand-book?" writes A. O. Royse of Greenville, Tennessee. I have Sawnier, Booth, Dennison, Excelsior and Grossman, but what I want is a work that makes a specialty of American watches."

There are no hand-books issued that dwell upon the treatment of domestic made watches. The theory of constructing new watches, plain or complicated. is the same in this country as well as the old world, and if the applicant has attained the practical knowledge how to construct a watch from the resources given by Saunier's or Grossman's editions, practice and ingenuity, supported by the hints of those books, will enable anyone to further his advancement in the art of watchmaking and repairing.

CHEAP CLOCK DIALS.

Benjamin Mallone, of Laurel, Md., writes: "Is there such a thing as a cheap dial, a dial printed on thin paper pasted on a zinc dial. Often I have clocks to repair with good cases, but the dial is cracked or part of the figures rubbed off or in some way mutilated and prevents making a good job. Now, if I should paste over it a paper dial, it would make a nice job at trifling cost."

Plain dials for clocks are furnished with or without the glass rim at a very small cost.

IS A BOW LATHE NECESSARY?

W. C. Olinger, of Lompoc, California writes: "Is it necessary to have a bow lathe, where you have a treadle lathe?"

If you have very small parts that require accurate, true and absolutely perfect work, you may start it on a treadle lathe, but to insure accuracy, finish the very thinly turned down parts on the bow lathe.

HOW TO FIGURE OLD GOLD.

J. L. writes from Lowel, Indiana, and asks as follows: "Please explain how to figure the cost of old gold at 4c per karat, per pennyweight."

Test the gold and acertain its alloy, that is to say its karat. The value of 4 cents a karat is proper and usually begins with low karat gold as follows:

Each pennyweight of	4	k.	gold,	4	x 4	16 cts.
"	"	"	" 6	"	6 x 4	24 cts.
"	"	"	" 8	"	8 x 4	32 cts.
"	"	"	" 10	"	10 x 4	40 cts.
"	"	"	" 12	"	12 x 4	48 cts.
"	"	"	" 14	"	14 x 4	56 cts.
"	"	"	" 16	"	16 x 4	64 cts.
"	"	"	" 18	"	18 x 4	72 cts.

The solder used in the manufacture of chains or other articles, very frequently reduces the proper karat of the article when melted, and it becomes necessary to re-assay. So that a 14 karat chain with many soldered links may only assay 12 karats after being melted coming to a low karat solder.

QUESTIONS THREE.

C. H. Clark, of New Castle, N. J., sends in the following: "What is the best way to clean balance-wheels and hair-springs? "What size graver do you recommend? "If a watch perfectly regulated, after six months begins to gain and cannot be regulated without readjustment, what is the cause?"

Sulphuric ether will instantly remove dirt and oil from any part of a watch, if immersed in that liquid and wiped with a clean, soft linen cloth.

No. 4 Vautier graver is the proper size to use for all ordinary engraving.

If a properly adjusted watch begins to vary after a period of six months, it can be attributed to the pivots mainly. Examine the pivots, and if a burr has formed on their ends. repolish them with a bell-metal file, upon which fine English rouge or diamantine may be applied. Very little endshake must be given the balance ax. so that both pivots are not subject to changes in their respective jewels, while the position of the movement is changed.

WANT A BOOK.

"I wish to get a plain and practical handbook on watch and clock making. Something thoroughly practical and provided with an index, so that I can find what I want at once."

The books to obtain will be "Saunier's Treatise on Modern Horology," complete and theoretical in every detail with illustrations. For sale by Chas. Reiss, Albany N. Y.

THINGS WORTH KNOWING.

To make magic polish for brass, add to sulphuric acid half its bulk of bi-chromate of potash, dilute with an equal weight of water, and apply well to the brass. Rinse it immediately in water, wipe dry, and polish with pulverized rotten-stone.

To protect the polish of metals, melt one part by weight of best wax paraffine, and when sufficiently cooled, add three parts petroleum. Mix well together, and apply to the polished article by means of a soft brush. The protecting film need only be very thin, therefore not too much should be applied.

The best way to remove rust from pinions is to scour them up with oil-stone dust and oil, till a smooth surface is obtained, then polish with crocus. Care must be taken not to grind the leaves off any more than is necessary, or the proper shape may be destroyed. Some workmen soak the rusted parts in a solution of cyanide of potassium, or other solvent of oxide of iron, but the use of such means cannot be approved. The way described is a good as any, and is safe. If the pinions are very badly rusted, they should be rejected and others put in, as they will be out of shape when finished off smooth, and would not perform in the watch.

If steel is rather hard under the hammer, when heated to the proper cherry red, it may be covered with salt, and hammered to about the shape desired. More softness can then be obtained, if further finish be required, by sprinkling it with a mixture of salt, blue vitriol, sal-ammoniac, saltpetre, and alum, after it is made cherry red again. When the steel is hammered into the required shape, it can again be hardened in a solution of the same mixture.

There are various ways of soldering stone-set rings, but the following will be found to be as good as any. Take tissue paper and tear it into strips about three inches wide, twist them into ropes, and then make them very wet and wrap the stone with them, passing around the stone and through the ring until the center of the ring is a little more than half full of paper, always winding very close; and then fasten upon charcoal, allowing the stone to project over the edge of the charcoal, and solder very quickly. The paper will prevent oxidation upon the parts of the ring it covers, as well as protect the stone.

MAGNETIZATION OF WATCHES.

Owners of watches who have occasion to be near an electrical dynamo when in operation are liable, if they get too near the machine, to have their watch magnetized—which at once shows itself by occasioning a change in the rate of going—often amounting to several minutes per diem. It is true that if the watch is never brought nearer than two or three feet of the dynamo the danger is but slight; for the electrical law is that the strength of the magnetism decreases inversely as the square of the distance. Thus the current at 2 feet distance is 4 times as weak as at 1 foot; or 9 times as weak at 3 feet as it would be at the same distance of 1 foot. So it, after a visit in the neighborhood of a dynamo, the watch suddenly becomes irregular as a time-keeper, magnetization may be suspected. The question may be decided at once by approaching the watch to a try compass, such as is commonly worn on a watch chain. If the compass needle is deflected on the approach of the watch, there remains no doubt but that the watch is affected, and must be demagnetized before it can again keep time correctly. By slowly moving the watch in various positions with reference to the compass we can judge where the magnetism has produced the greatest effect, and what is its polarity, and by the dexterous use of an ordinary horse-shoe magnet, by using the opposite pole to that indicated by the compass, the magnetism of the watch may be neutralized. The parts most affected are the balance-wheel, hair-spring, and the stem-winding bar; and these can be treated in detail. An ingenious instrument was devised to effect this object by rapidly rotating the watch quite near a dynamo or a strong magnet. A simpler method is to suspend the watch by two strings, each about two feet long, passed through and fastened to the ring of the watch, whilst the other end of the strings are held one in each hand. By twisting the strings the watch can be spun rapidly and in alternately opposite directions. This should be done with the watch close to one pole of the dynamo at first, and whilst still spinning, it should slowly be withdrawn from the dynamo till removed entirely from its influence. This will generally be sufficient, but if the compass test shows it is incomplete the operation may be repeated. The reason is simply that as one side of the watch is brought near the dynamo the steel parts within the case are magnetized by the dynamo, but to an opposite polarity. In spinning the watch, each side of it as it approaches the dynamo assumes one polarity; and as it recedes it assumes the opposite polarity. Thus, as the watch spins slowly, the magnetized parts change their polarity at each revolution. But the steel parts do not change their magnetism as rapidly as the watch can be rotated, and thus as the watch is moved out of the influence of the magnet it will be found that the polarities are so mixed up, so to speak, that they are lost, and the watch is neutralized. It is now once more ready to keep time as before the accident. J. H.

ANSWERS TO CORRESPONDENTS.

How can I restore the polish on opals blurred and scratched by wear?

By rubbing with oxide of tin or putty powder on a piece of chamois skin, wet; finish with refined chalk, also on chamois skin, wet, then wash the opal with a soft brush and water. With a little care this may be done without taking it from the setting.

How can the original white color of silver filigree jewelry be restored when tarnished by wear or shop worn?

First wash the articles in a solution of 1 fluid ounce of liquid potassa in 20 of water, rinse, and then immerse in a mixture of salt 1 part, alum 1 part, saltpeter 2 parts dissolved in 4 parts water. Let them remain for five minutes. Wash in cold water and dry with chamois leather.

W. H. H. asks the best known receipt for purifying the best sweet oil sufficiently for watch oil.

Put thin sheet lead into olive oil in a bottle, expose it to the sun for a few weeks, and pour off the clear liquid.

M. E. C., says: "If Mr. A. M. Mossman will rub his plate glass with a rag saturated with glycerine he will not be bothered with the accumulation of frost."

J. F. P. asks if a diamond will give light in the dark?

No; unless by phosphorescense after exposure to sunlight or the electric arc light.

M. A. M. writes: "I wish to preserve a portion of a polished steel surface and etch or eat away the remainder to a depth sufficient to receive a thick electro plate of silver, so that when plated, and the plating polished, it will be even with the preserved steel surface, so the whole surface will be even, but a portion steel and a portion silver plated.

This is what is called electro inlaying, and is only successfully practiced by experts in this style of art. The etching process is the same as for engraving steel plates. The protecting material is asphalt varnish, which may be used with pencil brushes for ornamented work or for stopping off any parts not required to be acted npon by the acid. Asphalt, resin, and beeswax about equal parts, varied for hardness to suit the temperature, is suitable to cover the surface, warmed by dabbing with a small pad. This allows of the figure being scratched in with a point. Nitric acid 1 part, to 4 parts water is generally used for biting in the figures. This, followed by a dilute muriatic acid dip for removing oxide and cleansing the surface, will probably prepare the piece for electro plating. If not, you will have to make a study of chemicals that will clear the surface so as to take the silver; possibly a few trials of cyanide of silver or potasso-cyanide may give you success.

CONCERNING CANNON PINIONS.

"I would like to ask the KEYSTONE the best way to remove a tight cannon pinion, when the centre hole is jeweled" is a request made by J. Stagg.

The best method to remove tight cannon pinions from centre posts, is to take the cannon pinion, as well as the end of the post, each between sliding tongs and pull them apart. If rusted, oil the parts well, and leave for a few hours, when another application of oil carefully heated with a blow-pipe until the oil begins to smoke, will loosen the parts, handled in the same manner as first stated. Care should be taken not to wrench off the centre staff, and allow it to break in the cannon pinion. English or American key-setting movents, should invariably be taken apart, and the operation confined to these defective parts only. In centre jeweled ¾ plate Swiss movements, the sliding tongs can easily be applied, while the movement is not necessarily taken entirely apart.

"Will some one be kind enough" says W. C. H. H., "to give through the columns of the KEYSTONE, the best method of straightening the cannon pinion of a watch movement; also the balance on the staff?"

Straightening the cannon pinion is out of the question, if the pinion is imperfect. The only remedy is to replace it with a true one. If the cannon pinion of any watch, regardless of make, is true, imperfection can only be attributed to the post on which it rests, the centre post or the long pivot of the centre pinion, carrying the cannon pinion. If this through some ill treatment has been bent, or brought out of centre, the only remedy will be to strengthen the centre post. Ordinary Swiss watches, are very frequently subject to his trouble, which can be avoided by fitting a well tempered centre-staff, with setting square for key wind, or plain round for stem wind. A well tempered centre square, cylindrically fitted, will with a perfect cannon pinion, answer its purpose for years.

To tighten cannon pinions, when the heads are loose, the best simplest, and most easy way is to roll the centre staff between two sharp files.

To true balance wheels, if they are riveted out of centre to the setting of the balance axis, nothing can be done to the rim or circumference of the balance wheel if untrue, except to turn a new staff with a tight fitting resting place, and an even hole in the balance. Truing balance from the side, is done by holding the bar of the callipers with its point alongside the surface of the balance raising and adjusting first the arms and circles to an even height.

"I have a bottle of chronometer oil," writes C, "which in cold weather shows flakes like cotton floating in it. Does that prove inferiority? Is chronometer oil better for watches than common watch oil? Please let me have the facts."

Opinions are various as to the best quality of oil to use for watches. Oil manufacturers should be called upon for their views on the subject. Flakes that show in oils are substances that will freeze in cold weather. The writer's experience is that the only oil that resists any temperature is that made by William Cuyper, which has only recently been introduced in this country, and is gaining favor rapidly.

A GOLDEN NUGGET.

A Comfortable little Fortune all in One Chunk.

There is at present on exhibition in Wells, Fargo & Co 's bank at San Francisco a bit of auriferous rock that any individual might be glad to possess. It might be a little cumbersome as a "specimen" scarfpin, but when the wearer reflected that it was worth between $6000 and $7000, he might be braced up to making the extra exertion. The nugget is one of the finest ever unearthed in California, both in size and richness. It is irregular in shape, and about the size of an ordinary Derby hat. That there is very little rock and a great deal of gold in it may be determined by its weight, which is 35 pounds troy. Quartz of this sort is usually worth $200 per pound, and, allowing the large margin of $1000 for rock, the nugget would be worth $6000. The exposed rock and great gobs of gold that hang out of its sides so as to nearly hide all other composition, and make it appear almost a melted metal, are not jagged or rough, but, on the contrary, are polished smooth and in a manner that only water is capable of. The proprietors of the nugget are Messrs. Hayes & Steeleman, of Sierra City, and they have left it on exhibition for a few days before disposing of it. At the bank it attracts much attention, but the employes could furnish no information concerning it beyond that it came from Sierra County and near Sierra.—*San Francisco Examiner.*

THE Queen of Japan has 721 diamonds, and has recently offered to swap every one of them for two hours of the sweet diplomacy of Thomas C. Platt.

OUR WORKSHOP.

THE LATCH STRING ALWAYS OUT TO THE TRADE.

Don't stop to knock, but walk right in and ask or answer questions as it pleases you.

We would like to ask, through your paper, of some brother in the trade, the best method of cementing lenses in field glasses? WYOMING.

Canada Balsam, or Balsam of Fir, is generally used for this purpose. Properly constructed lenses seldom need cementing.

B. H. S. asks: "Please tell me, in next issue, where I can get tincture of steel (mentioned in article on Damaskeening) and the probable cost. Can you tell me how to make it?

The tincture of steel you refer to is the common tincture of muriate of iron.

CONCERNING MAINSPRINGS.

F. D. H., of Stoneham, Mass., writes: "Having watched the KEYSTONE, I do not find much said about mainsprings to watches. Almost all kinds of watches have different sizes of barrels. To ascertain just the length to make the watch run the longest, how should we measure?

There seems to be a want of instruction on this subject quite generally in the trade. Main-springs are graded in an arbitrary manner, and until quite recently even the width of main-springs was not alike on the gauges of different dealers, or in other words, every dealer seemed to have his own standard. But of late years the Denizen gauge has came into such general use that there is something like a uniformity in widths and should be in thickness. But in this last respect the tape-guage soon wears or is moved, and a spring will gauge five in thickness on one gauge, and perhaps six or seven on another. What the trade needs is a standard and reliable gauge, showing 1-1000 of an inch, and then we could tell exactly what we wanted, and also determine precisely what we needed for a given main-spring barrel. We have the guage exactly for measuring the width and thickness of a main-spring in the Brown and Sharp michrometer screw gauge or calliper, but we also need a measure for the diameter of the barrel. Such a measure is also furnished by the Brown & Sharp Tool Company, (Providence, R. I.,) in the shape of a three square rule, three inches long and graduated to 1-1000 and also 1-64 of an inch. What the trade needs is a gauge like the Brown & Sharp screw calliper, but produced so it is cheaper. B.&S. charge $5.00 for the screw calliper, and fifty cents for their square rule. Such a calliper, in every way reliable, should be furnished for $3.00. And a steel flat rule, three inches long, showing 1-250's of an inch should be furnished for fifty cents. They can and will be if the trade will only insist on having them, and buy enough to warrant the manufacture. In the absence of such measuring tools it is impossible to give any definite rules or formulate a table. It is well however, to understand the principles involved. The ordinary Swiss watch should have 12 coils of main-spring in the barrel, and yield 5 or 5½ full turns of the main-spring arbor. If, when 12 coils of spring are in the barrel and the arbor will not turn the full 5 times, it is evident the spring is too thick, and it will have to be changed for a thinner one. In case of a main-spring too thick and strong, we will obtain more revolutions (turns) of the winding arbor by allowing only 11 coils of spring in the barrel. Fine Swiss watches, using a thin, weak spring, will require from 13 to 15 coils in the barrel, and yield 6 or 6½ full turns of the barrel arbor. In these cases the stop work should be set after one full turn of the arbor, which will leave 1 or 1½ turns of the arbor above, or unused above 4 revolutions of the arbor allowed by the stop work. The ordinary Swiss watch, with 5 turns of the arbor, should have the stop work set at about half a turn, so as to allow the upper half turn to save straining the barrel hook for the main-spring. English fusee watches should have 11 full coils of spring in the barrel, and afford 4 full turns of the barrel arbor. Most of the full plate American watches have 12 coils in the barrel, and should have 5 full and complete revolutions of the winding above. This last condition should be looked to with especial care, as we have so many imitation American springs which are too strong, and consequently too thick, and when first put in will hardly give us 5 turns; and after a time the spring will loose a little of its elasticity, and we have the watch brought back with the story that it will not run full 24 hours. By good rights all American barrel arbors should yield 5½ turns when the main-spring is first put in. In stem-winding watches the square where the ratchet goes affords only a slight hold for a pair of slide-tongs to grasp it. If any such difficulty is experienced, the better way is to put the spring into the barrel and place it in the watch and wind from the stem, counting the revolutions of the barrel arbor. The spring should be let down and wound three or four times, because a spring when wound for the first time will show more turns than it will on subsequent windings, as a part of the elastic power is lost after one or two windings. After this there is a slight falling off, but it will not be more than 5 or 6 per cent. for a year. The width of a main-spring is easily found by the depth of the barrel, and a spring should be as wide as the barrel will allow to work free. But this is good deal a matter of judgment as to how much the barrel cover is turned out; but a little practice, with a knowledge of what is required, will soon determine this. We would advise you to procure one of the triangular rules mentioned above to get the exact diameter of barrel across the centre at the dotted line *a*, Fig. 1, in 1-100 of an inch. This will determine the strength of the spring you will require. We can not give a rule for determining the length, for the reason a spring should not be straightened out to measure it. A little experience will soon set you right about the length, and if you err let it be on the safe side, by breaking the spring too long, because if too long it is easy after one trial to get the proper length, when the hole ahould be made in the end of the spring to engage the barrel hook. We have put the matter into the hands of our watchmaker to prepare a table for the use of the craft. This table will give the thickness of spring required for a given diameter of barrel, after measuring the diameter as at *a*, Fig. 1. Suppose, for instance, we measure the diameter of the barrel chamber (as at *a*) and it measures 78-100. The table will give the Denizen No. and also the thickness in 1-1000. The table will be ready for the March number.

TO OXIDIZE BRASS.

J. K., of Germantown, asks: "Would like to ask, through the medium of your Workshop Notes, for a receipt to oxidize brass, also for a lacquer or varnish to protect polished brass work."

Muriatic acid, and arsenic in the proportion of one ounce of acid to two ounces of arsenic (arsinous acid) will blacken brass. Lackers of all kinds are made by dissolving shellac in alcohol or wood spirit. As good a method for a beginner is to keep adding shellac to a sufficient quantity of alcohol until the varnish is as thick as you think you need. As a rule beginners make their lacker too thick; about one ounce of shellac to ten or twelve of alcohol is about right. To this shellac varnish is added various coloring matters, soluble in alcohol, to give the lacker a golden color. These colors used to be obtained with dragon's blood. aloes, and gambage; but recently *analine* colors, such as are sold as poor man's dyes, diamond dyes, etc., afford all shades of yellow and red. These added to the plain shellac varnish will give all the imaginable gold, red gold, and coppery hues one can desire. All work to be lackered should be warmed, and the lacker applied with a soft camel's hair brush, several coats can be applied.

PERSONAL MAGNETISM AGAIN.

J. W. H. writes from Villa Rica, Georgia, to say: "I have been repairing watches for the past twelve years, and as far back as nine years ago I cleaned a watch for a Tallapoosa copper miner, and had it in my possession a month. It was in first-class running order during all this time. He sent a comrade for it. When I handed it to him he held it in his hand ten or fifteen minutes, then looking at it before going to put it in his pocket, it had stopped. On handing it back to me it commenced running. When it was taken to the owner I know it run and kept good time for two years. The man's own watch would not run when he carried it, but would when he hung it up, or it was carried by another. He often told me of two other persons having the same peculiarity. It is a self-evident fact to me that it was the magnetism in these men that interfered with the movements of their watches."

To this our specialist says: "The KEYSTONE columns are open to all persons who have novel and useful ideas to impart. But it is useless to publish matter which merely leads to disquisition, attended with no beneficial results. This is in reply to two communications on the influence of personal magnetism on pocket watches. We gave our opinion on this subject in a former notice, and are at a loss to understand how and why people will insist on a force they have no sound evidence for. Let those persons who contend for the influence or personal magnetism test their powers on a very simple and convenient instrument, to wit.: a pocket or a surveyor's compass. Now if personal magnetism will affect the steel and other metalic parts of a watch it will show and tell on the delicately-poised needle of a compass; and as soon as any man or woman can deflect, by personal magnetism, a compass needle one thousandth of a degree from its indicating the magnetic meridan, we will retract and own up to the corn. We regret very much that we are compelled to close our columns to any of our subscribers, but in this case the ground has all been gone over time and time again by scientists in this country and Europe. The subject of animal (now personal magnetism) has been discussed in all phases and under all names, like Odylism, Mesmerism, Psychic force; but in every instance where tangible evidence was insisted upon, the failure was complete. The divining rod—witch hazel twig—has had dozens, yes, hundreds of believers, and led to no end of bother. One English nobleman taking the trouble to buy a lot of solid silver plate to test the powers of a Portuguese boy who was astonishing hundreds with his power with a divining rod; but when tested by actual experiment failed to locate several hundred ounces of silver concealed in a freshly-ploughed field. An excellent expose of such matters will be found in the *Popular Science Monthly* for May and June, 1877, by Wm. B. Carpenter, L.L.D., F.R.S It has also been fully discussed by M. M. Cheveral and Biot. At Madison, Wisconsin, is an observatory for recording magnetic phenomena, and visitors are deprived of all iron or steel instruments. But such a thing as personal magnetism is never talked of in a place where crucial tests as fine as a deflection of a thousandth of a degree in a magnetic needle is actually measured.

ILLUMINATED CLOCK.

The accompanying engraving represents a simple and practical device which embodies a day, night, and medicine clock, and which also provides a night light. Within the base is placed a clock mechanism, the hour spindle of which passes up through the centre of the top and is secured to a dished plate, which is by this means revolved once in twelve hours. Resting upon the plate, and, of course, turning with it, is a dome-shaped globe of white glass, having the hours and quarter divisions marked distinctly in a circle upon its exterior. Secured to one side of the base is a pointer which extends to the row of figures. It is evident that as the globe revolves, the time will be indicated by the pointer. Within the globe is placed a small lamp, which serves to render the figures and pointer plainly visible, so that the time may be read at night, and also to illuminate the room with a soft and yet sufficient light. Adapted to rest on top of the globe is a second pointer, which may be placed at any desired distance in advance of the stationary pointer. Tnis will be found of value in the sick room, as, when giving medicines, the second pointer can be placed the required interval between doses—say two hours—in advance of the other, the lapse of the time being noted when the points are together. By thus combining a lamp and clock, a most convenient and valuable article is produced.

An Illuminated Clock.

These clocks are manufactured by the W. C. Vosburgh Manufacturing Company (limited), 418 Fulton Street, Brooklyn, N. Y., and 184 Wabash Avenue, Chicago, Ill.—*Scientific American.*

WITHIN the last year about 8000 miles of railroad have been built. Thereby about 80,000 square miles of territory have been brought within five miles of a railroad, and a far greater area benefited less directly. More than 50,000,000 acres of good farming land, on which it was not profitable to grow many crops a year ago, have been brought within reach of markets and made more valuable by the railroad building in a single year.

QUAINT SAYINGS.

At the Annual Dinner of the New York Jewelers Association.

At the annual dinner of the New York Jewelers' Association there was a full attendance, and the speeches were unusually good. So good in fact, that the liberty is taken of reproducing a few choice bits. Horace K. Porter said: "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." The Rev. Dr. Tiffany among other good things, informed his audience that: "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 ennobles 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." R. B. Roosevelt told the following veracious tale: "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. 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."

Noah Brooks made an excellent point and introduced a story of Abraham Lincoln which had not been perforated by worms: "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.'"

GARNETS, those handsome dark-red stones are always favorites among the lower-priced gems, and yet how few persons ever know or care where they are originally found. Professor Vivie, of the Bohemian Museum, recently made a flying trip to one of the localities where they are found in his country, and his description is worth glancing over. It is near the mountains that separate Germany from Austria, at Podseditz, in northern Bohemia, and the tract of land where the garnets are found is not more than a mile square. Entire families, old folks and little ones, spend their days digging in this space, winter and summer, hunting for the garnets. The ground is dug up two feet deep and carefully piled up one side to be replaced later. Then the family or the group of miners dig a trench about fifteen feet wide down to the stratum of gravel twelve feet below the surface in which the garnets are found. This gravel is brought up in pails and baskets and sifted. The fine sand is sifted out and the larger pebbles and what is left is sorted into two heaps, according to color, as the yellow gravel contains more garnets than the gray. These heaps are divided equally into two parts, one of which belongs to the owner of the field, and the other to the miners. Each carts his pile home and washes it, after which the garnets are easily distinguished and picked out from the gravel. They are sorted according to size, and sold to dealers who have agents on the spot. A cartload will produce usually from $1.20 to $12 worth of garnets. The sifted gravel and dirt is then replaced in the trench by the women and children, the largest pebbles at the bottom, so that the field is not spoiled for agriculture, but improved. The smallest garnets are bought by the pound for thirty cents, the larger ones for forty cents a pound. When polished of course they are worth much more. The largest sized ones sell for about forty cents apiece.

MOTHER-OF-PEARL, from which ornamental buttons, buckles, fan-sticks, cardcases and other fancy articles are made, is the principal production of Tahiti, and makes a commerce variously estimated between $20,000 and $100,000 a year. But G. B. Brandly, in *La Nature*, states that the lagoons in which the oysters producing this material are found are growing poorer every day, and that unless protective measures are adopted they will be impoverished, if not ruined, in a few years.

A JOINT or gimmal ring was anciently a common token among lovers. It was generally made of two or three hoops, so chased and engraved that, when fastened together by a single rivet, the whole three formed one design; the usual device being a ring. When an engagement was contracted, the ring was taken apart, each spouse taking one, and the third one being presented to the principal witness of the contract.

THE CLOCK WAS SET.

And went off in a Darkey's Pocket, Creating a Panic.

He was a darky who wanted an alarm clock. This was his mission when he entered Hart's jewelry store. After getting in there he informed the accommodating clerk of the nature of his visit, and that individual hastened to wait on him. He wished the clock set, so as to spring the alarm at 3.30 A. M., as that was the hour at which he had to get up, as he worked in a restaurant that required early service. He was particular as to the time he wanted it to go off, for he was going to the theatre to spend the earlier part of the evening and was anxious not to oversleep himself the next morning. Tom Rogers, the clerk, a jocose fellow on such occasions, at once saw the opportunity to have some fun at the dark purchaser's expense, and took advantage of the same. He set the alarm accurately to go off at 9.30 P. M., put the clock in a box, received the price and handed over the parcel. The buyer put the timepiece into his overcoat pocket, loitered around unconscious of any impending racket until it was time to go to the play. Then he entered, and in company with his best girl took a seat in the gallery. He soon became absorbed in the fate of the hero on the stage and had no thought of his overcoat, that he laid on the chair next to him. Everything was perfectly quiet. Suddenly there was a resounding clatter in the pocket of that big coat. Such a going around and buzzing interrupted the gallery proceedings. The shock aroused him from his reveries and his seat at the same instant. With a frantic clutch he grabbed the coat, clapped his hat over the instrument of noise, vainly endeavoring to still its din.

The colored lady by his side shrieked out in wild affright. A Senegambian philosopher in his rear gravely explained to the startled persons around him that the man had developed into a battery of electricity, and to move away from him or they might get struck. This caused a commotion. While this was going on the clatter ceased with as little warning as it had begun. Silence was restored, all save the audible smiles that circled round the gallery. As soon as the purchaser had recovered from his surprise he took in the situation, appreciated the joke, and afterward detailed his experiences to Tom Rogers, saying that "durned thing made him lose a whole act."—*New Orleans Times-Democrat.*

A WARNING TO THE BEAUX.

How the Ladies Learn the Cost of Diamonds that their Admirers give them.

"The girls are growing more mercenary every year," remarked the senior member of a Broadway jewelry firm lately. "Why, if the young men only knew—but then it's none of our business. Here comes another, I'll bet."

A fair creature enveloped in sealskins and wearing the jauntiest little bonnet ever turned out of a milliner's hands, walked up to the counter with a business-like air. Diving into her reticule she brought forth a tiny jewel case containing a diamond.

"Will you tell me, sir, what it will cost to have this duplicated?"

The expert in diamonds looked at the young lady severely, and inquired if she desired to have the setting exactly similar.

"Oh, yes, I must have something the exact counterpart," she replied, somewhat embarrassed.

Examining the stone the jeweler stated that he could furnish a similar one and set it for $90.

"Well, I declare, I thought it would cost at least $250," exclaimed the fair creature. "Tell me, is this not a pure white stone?"

"No, madam, it is not. It is off color, and has not the requisite fire. But it is a fair stone for $90."

After the lady had departed the jeweler sighed and said that she made the tenth. It was only ten o'clock, and that rate would make a hundred by night.

"You see," said he, "nearly every young man believes it the proper thing to present his best girl with a diamond. Many of them cannot afford to pay for a gem which is of the best grade, so they buy a stone that is off color, thinking that the young lady, not being an expert will never know the difference. But, bless you, some are a match for them every time. They simper and smile and exclaim, 'Oh, how lovely!' but as soon as convenient they slip around to a jewelry store and find out its true value. Now, that young lady had no idea of getting a duplicate. She took that means of sizing up how much her dear George loved her. We are bothered to death with such visitors."

While the jeweler was chatting to the reporter a colored lady, attired in the latest devices of fashion, purchased a brilliant and planked down $240 without a murmur.

"Some of our best customers are colored people," said the jeweler. "When they have money they wear good clothes and good jewelry. Diamond earrings are set off better on a dark background, and the colored ladies understand it. This is the best season we have had in many years. Everyone wants to buy a diamond. A coachman, whose employer is at the head of one of the largest banking establishments in the city, paid a half year's salary for a diamond the day before Christmas. He has no confidence in banks, and he knows that a diamond will always bring a good price. He puts his money in diamonds instead of the banks."

"What class of diamonds are in most demand?"

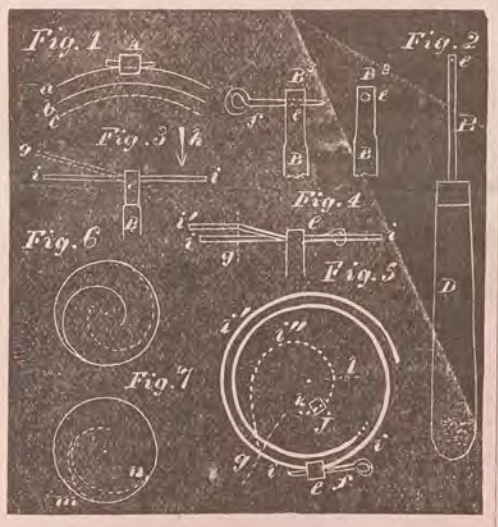
"Brilliants. They rank second in grade. The gem comes highest. It must be of good color, well cut and full of fire. If a well-cut stone of good color lacks fire it is ranked with the brilliants. Most diamonds are of this class. They are often of the finest color, but the fire is absent, and that is the first requisite for a gem. Few people not in the business are able to detect any deficiency of this sort, and that is why we are bothered to death with visitors who ought to pay a consultation fee the same as they would to a physician. A brilliant is valued according to its color. Often a stone will be white, but have a flaw in some other respect. The cheapest diamond is the rose diamond. It is usually small and flat on one side, and has to be set on a solid surface. Such stones are frequently used in clusters or on the cases of watches. It has got to be an established custom now for gentlemen, as well as ladies, to leave their diamonds in safe deposit vaults when not in use."—*N. Y. Mail and Express.*

HAIR-SPRINGS AND SPRINGING.

By Our Watchmaker.

No. V.

Perhaps it will be well to explain the closing remarks of the last article when speaking of obtaining isochronal adjustments by two entirely dissimilar methods. I made mention of a Brequet hair-spring in illustration, not but what with the ordinary flat spring, if we changed a pair of brass screws for a pair of gold or platinum ones, we should quicken the long vibrations for the simple reason that for equal weight there would be less atmospheric resistance, consequently the long vibrations would be quickened. The method of manipulating a Brequet hair-spring will be considered after a few points and hints have been disposed of in illustration. A flat hair-spring which could not be adjusted to isochronism so the long vibrations were slow enough; although fourteen brass screws were in the balance, came to adjustment readily when a whole coil was broken off, and the spring pinned in, as shown at Fig. 3, January number. But there were four additional screws needed to bring the watch to time. The added screws were two of ordinary size, and two small or half screws. In this case we would naturally say the addition of the four screws by the increased atmospheric resistance made the long vibrations slower. True they would; but there are other factors involved in the problem, as illustrated in Fig.1, where *A* shows the stud, and *a* the outer coil of a hair spring; and *b*, the next inner coil, before the outer coil was broken off. But after this was done, and the coil, *b*. pinned in the stud, *A*, the then succeeding outer coil would be at the dotted line, *c*; leaving a wider space between the two outer coils. Now, this moving away the outer coil has a tendency to change the isochronal action, but a much greater influence on the quarter adjustment to position, like XII up, VI up, IX up, or III up. But to tell how to take advantage of the change in adjusting would be a long story, and no two adjusters would agree, if you should refer the matter to them.



Some twenty five or thirty years ago, some of our best watches were sprung with hair-springs, in which the space gradually diminished between the coils, so that the distance between the outer coils was about double the space of the inner ones. But it is very doubtful if there is any very marked result to be obtained except in the relation of the two outer coils. The writer would very much like to give illustrations and elaborate theories, but space cannot now be given to properly consider the subject of adjustments much further. But for the benefit of those who would like to experiment, I would say for isochronal adjustments, substitute a wreaker main-spring for the one properly required; using a spring with only force enough to produce ¾ of a revolution of the balance, when wound three turns of the main-spring arbor. Now for six hours compare the rate of the watch with a good compensated pendulum clock. Repeat the observation three times, and note the exact variation between the clock and the watch. Change the main-spring to the one generally used, or one a little stronger, so you will get vibrations to the extent of 1½ revolutions of the balance. Now, carefully compare the rates of the long and short vibrations. If they are alike, the hair is isochronal, and your adjustment is all done; but, if the short vibrations are the slowest, let out your hair-sping a little. But, if your short vibrations are quickest, take up your spring a little, and bring your watch to time by the time screws. These are rules which apply to flat hair-springs only. Now for putting on a Brequet spring. Select a spring precisely as you would if you were going to put it on flat; pin it in the collet, and true it in the round and flat, precisely as if to be used as an ordinary flat spring; vibrate it also to get the right length, and then for the over coil. This is very simple. Provide yourself with a piece of hard brass wire, one and one-half inches long, and about one-twentieth of an inch in diameter. Insert this piece of brass wire in a small wooden handle, as shown at *B*, *D*, in Fig. 2, where *B*, represents the brass wire, and *D*, the handle. In this cut the parts are shown about half size. The end of the brass wire, *B*, at *e*, is squared and a hole drilled as shown at the dot. This hole should be about the size of a No. 7 sewing needle. At diagrams, *B 2* and *B 3* are shown enlarged (four times), a view of the end *e* of *B*. At *f*, is shown a pin for holding a hair-spring in place while the bends are made. At Fig. 5, is shown a portion of the two outer coils of a flat hair-spring we propose to bend. We commence by passing about two-thirds of the outer coil through the hole *e*, and pin it fast with the pin *f*, as shown in Figs. 3, 4, and 5. The pin *f*, can be fully three quarters af an inch long, and a ring bent round at the end for the purpose of pushing it firmly into place. At Fig. 3, we have an edge view of the hair-spring shown at *i*,*i*, pinned firmly at *e*, with the pin, *f*. At Fig. 5, we see the hair-spring as if run in the direction of the arrow *h*, Fig. 3. We have now our hair-spring secure in the holder *B*. We next sieze it with a pair of strong tweezers at about the point indicated at *g*, Fig. 5, and bend the portion from *e* to *i*, Fig. 5, upward until it stands at the angle shown at the dotted line *g*, Fig. 3. We next loose the pin *f*, and move the wire *B e* to the point indicated at *g*, Fig. 5, where we securely pin the hair-spring with the pin *f*, and bend it so the part from *g* to *i''* is paralell with the main portion of the spring shown at *i i*, Fig. 4. So far, although we have made two bends in the outer coil of our spring, and yet if seen from above it will seem to be the same as before we bent it. The next effort is to bend the part of the outer coil from *g* to *i'*, so it will be shaped as shown at the dotted line *i''*. It is usual to arrange the bend at *g*, so it will come under the balance bridge and consequently be concealed. This arrangement gives a Brequet hair-spring an elegance of action and appearance which can never be attained by a flat spiral. The stud to which the outer end of the hair-spring is attached should be at about the point *j*, and the curb pins of the regulator at the point indicated at the dotted line *i*. This spring, like the cylindrical spring, is not improved by the use of a regulator. The best results of a Brequet spring are to be obtained by bringing the watch to time by means of the mean time screws in the balance rim. The isochronal adjustment of a Brequet spring is obtained by manipulating the elbow at *g*. This will be understood after we speak a little of the cylindrical spring. These last named springs are, as the name indicates, a coil of hair-spring wire wound on a solid cylinder of some metal, and then hardened and tempered. There should be about ten coils, and the ends terminate opposite each other as shown in Fig. 6. The long vibrations are quickened by making the terminal bend abrupt as shown at *m*, at Fig. 7, while the long vibrations are made slower by letting the terminal curve be more gentle like the curve shown at *n*. This same condition holds for a Brequet spring making the band at *g*, Fig. 5, abrupt, quickens the long vibrations. The great skill in applying the Breguet hair springs lies in making the bends. In making the bends for the rise as shown in Fig. 4, a pair of tolerable heavy flat-pointed tweezers are used; but the curved bends, as shown at *i''*, are done with hair-spring tweezers with the points one blade convex and the other concave. In making the terminal bend, the fact that all bends will recede a little as described and illustrated at Figs. 1 and 2, January Number, must be kept in mind. I have repeatedly in these instructions spoke of avoiding bending a hair-spring any more than is absolutely necessary, and now we shall keep this in our thoughts, and let it control our efforts. True, in making the over coil, we bend the curve at *i''* more than we intend to ultimately let it remain, but we only do it in order that we may, when we leave it, have the spring in that condition that the curves and bends are about as rigid and permanent as if the spring was hardened and tempered in that form. In bending the elbow at *g*, we must not get the coils so they touch when in action. This will be effected by now letting the elbow bend extend much back of the point indicated at *g*; this must be born in mind when making the curve at *g* less abrupt when we desire the long vibrations to be slower.

THE SHAH IN HIS DIAMONDS.

In the presence of the Imams and dignitaries of the Court the Shah receives the salutations and New Year's greetings, accompanied by effusive and long-winded compliments; the court poet recites an ode or panegyric upon the wisdom, and above all, the discernment of the King of Kings. Later on the members of the various *Corps Diplomatique*, after being received by some of the Ministers of State, are admitted into the presence and behold the august countenance of the shadow of God. Although he has a larger collection of jewels than any other monarch, this is one of the few occasions upon which he displays them, for as a rule the Shah dresses plainly and in quiet colors, with only a few diamond buttons on his black cloth coat. But on the New Year his Majesty is usually bedecked in his most magnificent jewels, many of which were brought by the ruthless Nadir Shah from Delhi; his tunic is ablaze with diamonds, his belt, sword and scabbard incrusted with the same costly gems, and in his hat is the algrette or distinctive emblem of his royalty. The ceremony is usually not a long one; his Majesty addresses a few words to the Ministers, inquires after the state of their country and the health of their respective sovereigns or Presidents. The distribution of bags of money —which, by the bye, year by year decrease in value—and the distracting noise of twanging musical instruments announce that the reception is over. The coins presented are in tiny silk bags made for the occasion, and consist chiefly of silver as thin as a wafer; sometimes there are a few gold pieces among them about the size of an old silver penny, of not much intrinsic value, but much appreciated in Europe when mounted as ear-rings, buttons, and other ornaments.—*London Society.*

AN OPAL VANISHES.

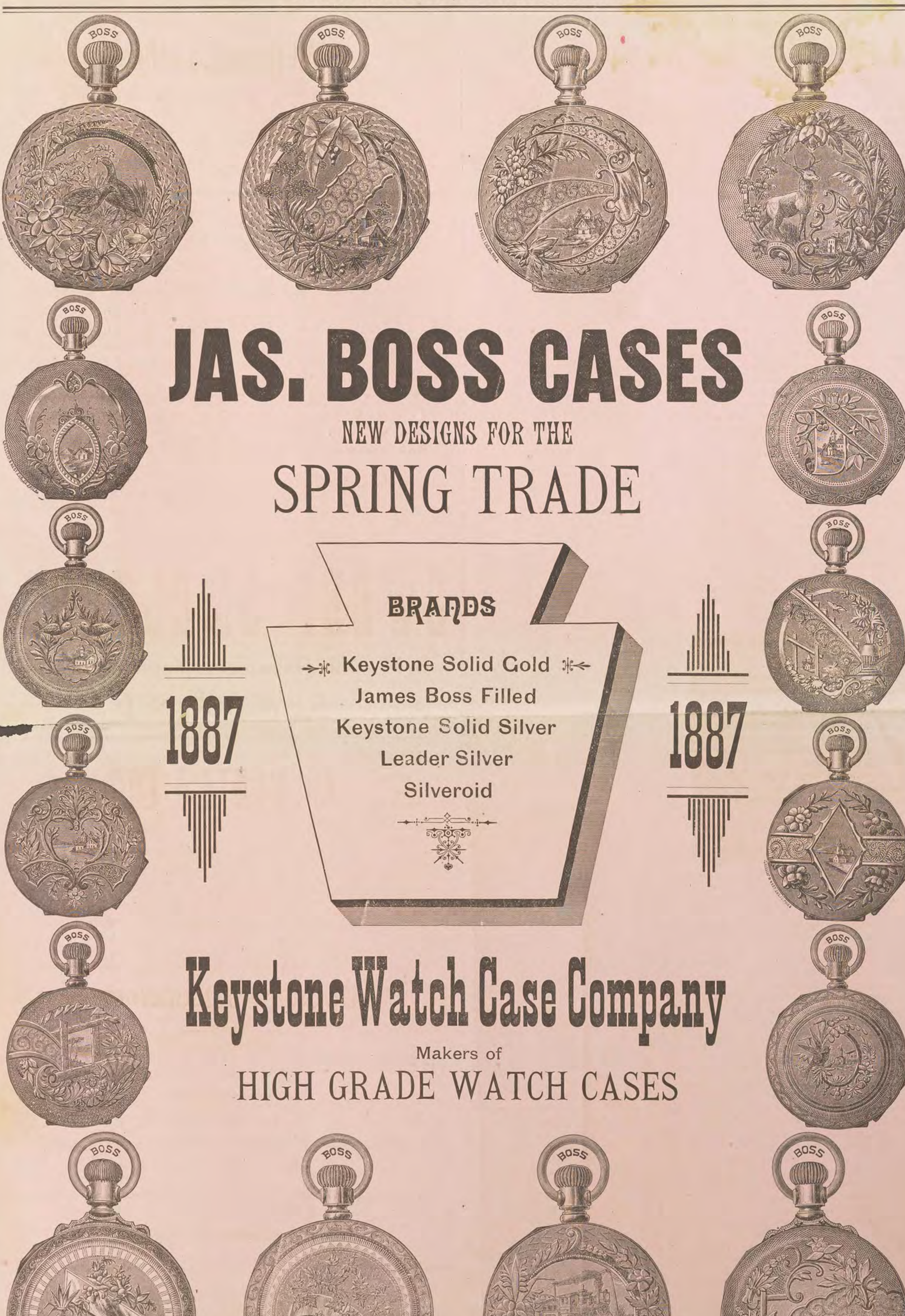
An Affair that Makes Talk in Chicago Upper Circles.

The lum-tums of Chicago have been enjoying a choice bit of scandal. The menu opened with the marriage of a rich old gentleman and a tiny blonde widow, which is the culmination of a long and tender attachment and the depletion of several fine suits of hair, once the pride and glory of the groom's children.

At a swell dinner party the hostess retired to her boudoir with the ladies, leaving her husband to open the Havana case and loosen the tongues of the gentlemen, while she displayed a tray of very choice opals, purchased in Mexico a short time ago. Something like an hour was devoted to both occupations, and when Madame came to collect the "melancholy gems" the one of great price was missing.

One lady had been especially outspoken in her admiration of the solitaire, and when the search among the rugs and ruffled trains was exhausted the mistress openly accused her appreciative guest of appropriating the stone. The consternation that ensued would have been a fortune to an Ouida.

Jeweled hands went up in astonishment, plumbagoed eyebrows followed, lovely white arms beseechingly extended to the fearless hostess, who stamped about like a drum major. raised her voice to F sharp and authoritively demanded the restoration of her "sunset opal." The accused, who is something of a Delsarte, caught her cue, reeled toward a Persian couch, screamed and fell back with a degree of artistic finish that merited promotion to the most advanced class. Of course the party broke up, and the correspondence now going on bears the stamp and signature of two well-known lawyers.


BOSS
JAS. BOSS CASES
NEW DESIGNS FOR THE
SPRING TRADE
1887
BRANDS
Keystone Solid Gold
James Boss Filled
Keystone Solid Silver
Leader Silver
Silveroid
1887
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HIGH GRADE WATCH CASES
CROSSCUP & WEST ENG. CO. PHILA.

CLEVER DIAMOND THIEVES.

Feeding Precious Gems to a Dog and then Killing the Dog.

Although there is a considerable and clever detective staff on the dismond fields, there are those at Kimberly who can outwit the police, at any rate for a time, and so it is that such a numbes of stones are annually stolen as to prove a factor in disturbing the market price, says *Chamber's Journal*. The chances of detection are great no doubt; but the hope of securing a few hundred pounds by a little speculation is so tempting that there are always hundreds of men at "the game."

Some of the thieves—that is, the men who steal the stones they are paid for unearthing—display great ingenuity in carrying away the gems. The business of diamond digging is naturally of a rough-and-ready kind, and presents opportunities for fraud which are not available in other industries. When diamond stealing first became a business those interested, suspecting no evil, were easily cheated. Stones were then carried away concealed about the person of the laborers. But as the thefts increased, greater precautions were taken to insure the detection of the thieves.

Some of the "dodges" which have been resorted to in order to carry diamonds from the diggings have been not a little remarkable. We have only room, however, for a sample or two. Upon one occasion it is related that an ingenious laborer wrapped the stones in a small piece of soft bread, the morsel being greedily snapped by a dog. The dog was carefully looked after till the mine was left behind, when it was ruthlessly killed to obtain the hidden diamonds which were contained in its stomach.

Domestic fowls have been trained to swallow the smaller stones, which have afterward been cut out of their crops. A parcel of stolen gems has been known to have been got out of a well-watched digging by having been ingeniously fastened to the hair of a horse's tail.

WEDDING RINGS.

A Custom that has come down to us from the Bronze Age.

While innovations have been made in every particular of the wedding ceremony, the ring has never lost its place, and so essential was it thought to be that many of our ancestors would have considered their marriage null and void without it. Indeed, there are many cases on record where in the omission of a conventional band of gold the most homely substitutes have been used; rings of curtains, for example, or a circle cut in leather. Just so the symbol of unending love and fidelity was employed they were content. In our own city, in comparatively recent years, a couple were united with a thimble, the groom, having by mistake put the wrong box in his pocket. As early as the bronze age rings were exchanged by lovers as pledges of enduring devotion, and were on occasions employed not only to seal the contract, but to introduce the tender subject.

In England the most popular love-ring was for a long time the gimmal ring, formed of two narrow gold bands, which were broken apart at the betrothal, each of the contracting parties wearing one on the engagement finger—the fourth on the left hand—until the wedding day, when these bands were again united and placed on the bride's finger. This was very suggestive, for the ring was but the pledge which was redeemed at the altar. There are several theories in regard to the fashion of wearing the engagement ring on the left hand; the most poetic, however, is that a nerve connects this directly with the heart. To the maiden of the nineteenth century the "the perfect arrabo," or the assured pledge of a perfect promise, is a "solitaire" sufficiently large and brilliant to stir up feelings of envy in the hearts of less fortunate *fiances*, while the wedding ring is most frequently a plain band without gems, and is considered of far less importance than the betrothal ring.

TEACH THE BOY A TRADE.

Industrial Education One of the First Necessities of the Age.

The importance of the advance in educational methods is rapidly making an impression on public sentiment, but there is no danger of its spreading too fast. The necessity for industrial education is now conceded by all who have given the subject thoughtful consideration, and the question has reached a point where it is one of ways and means and of how to get public sentiment up the level of action. The old-time apprenticeship system has practically run out, and in the few cases where it does operate is restricted. The boys are emerging from the school-house to find places in business life or room to crawl up to a place in the overcrowded professions. The girls are largely gravitating toward the lines of labor filled by their fathers before them, and here and there a lad strays into a shop and picks up a smattering of trade simply because he is obliged to go to work. One thing we must also notice, and we do it with regret. In our cities, both metropolitan and provincial, a far too large contingent of boys retire from the school-house with little more in their heads than a mania to be experts in the popular sports of the time, and before they fairly realize it have drifted into a *quasi* profession and entered upon a calling that promises no substantial future and at best furnishes but a precarious means of support. The average boy has no fixed notion of what vocation in life he will come up to. He is a young animal, and the young animal runs riot, and unless his steps are directed with unusual care maturer years simply drift him into a place in the world's work.

The prosperity of this country and its future degree of development depend very largely upon increasing industrial efforts in skill as well as in numbers. It is the cunning and cleverness of the artisan that improves his material condition by attaching a high competitive value to his product. To this end natural faculty is an essential, but more depends upon a thorough education in the use of tools and an insight into the fundamental principles of constructive effort. In this last particular the book comes in as the most practical form of presenting the aggregation of human experiment and experience, but it obtains greater developing force by being associated with the material substance and form. Industrial teaching is nothing more than the enlarged kindergarten that operates to draw the boy out—not to stuff him with a mass of collated facts and rules that he does not understand. Against the plea of industrial education men cite the results of the old-time country school-house from which the boy went to the forge and the carpenter's bench and made a success of life. Nothing could better illustrate the need of industrial education than this citation ignorantly offered against the system. In the first place the teacher possessed positive force of character. He was a leader whom the school followed. While he held strictly to the fundamentals of the book, he exercised wisdom and originality, and led the pupit into the book. Since his time there has been a great change, and the average modern teacher makes a gigantic struggle under the guidance of "boards" and superintendents to crowd the book into the pupil. But to follow the application: The lad came from under the master's tutelage to enter upon a severer one with the hard-headed blacksmith. He learned that there was much cunning in the hammer and the anvil, and as time went on he observed that in a case of necessity skill could accomplish very much with a few tools.

Now the tools of those days are cunning mechanisms. Machines make the bolts that the old-time blacksmith laboriously forged, and turn out the "finish" that the carpenter wrought with hand tools, and what industrial progress requires is to introduce the boy to the tools of the time. The contract will develop the latent genius in time, if there is any, and while his doting parents may have dreamed that he was born into this world to be great and good as a parson, or famous in law or medicine, it may prove that he has a gift for building things. From this education the world may be saved a clergyman of mediocrity or a trustee-writ lawyer, while it gains a strong, forceful man in the fields of industrial products. In the ordinary course boys would be better equipped by a practical addition to a common school education to enter directly upon some field of remunerative labor. The majority of boys have their way to make in the world, and it is only the few who can step into the advantageous places made for them by friends or relatives. For the boy who has his "roe to hoe," less algebra and a little practical knowledge of the principles by which machines perform their specific work is best for him. The unknown quantity he most needs to become acquainted with is not x, but the personified x in the machine with its wheeels, eccentrics, levers, gears, and so on, actually doing the things the book describes. Our system is yet a long way from popular support of industrial education, but the foremost educators of the day see it in the future and are pressing public sentiment toward it. The State maintains that it is its duty to educate the youth to be the self-sustaining and law-supporting citizen, and surely that system must be best that best fits youth to enter the ranks of labor with some practical training, rather than as perfectly raw recruits.—*Manchester (N. H,) Union.*