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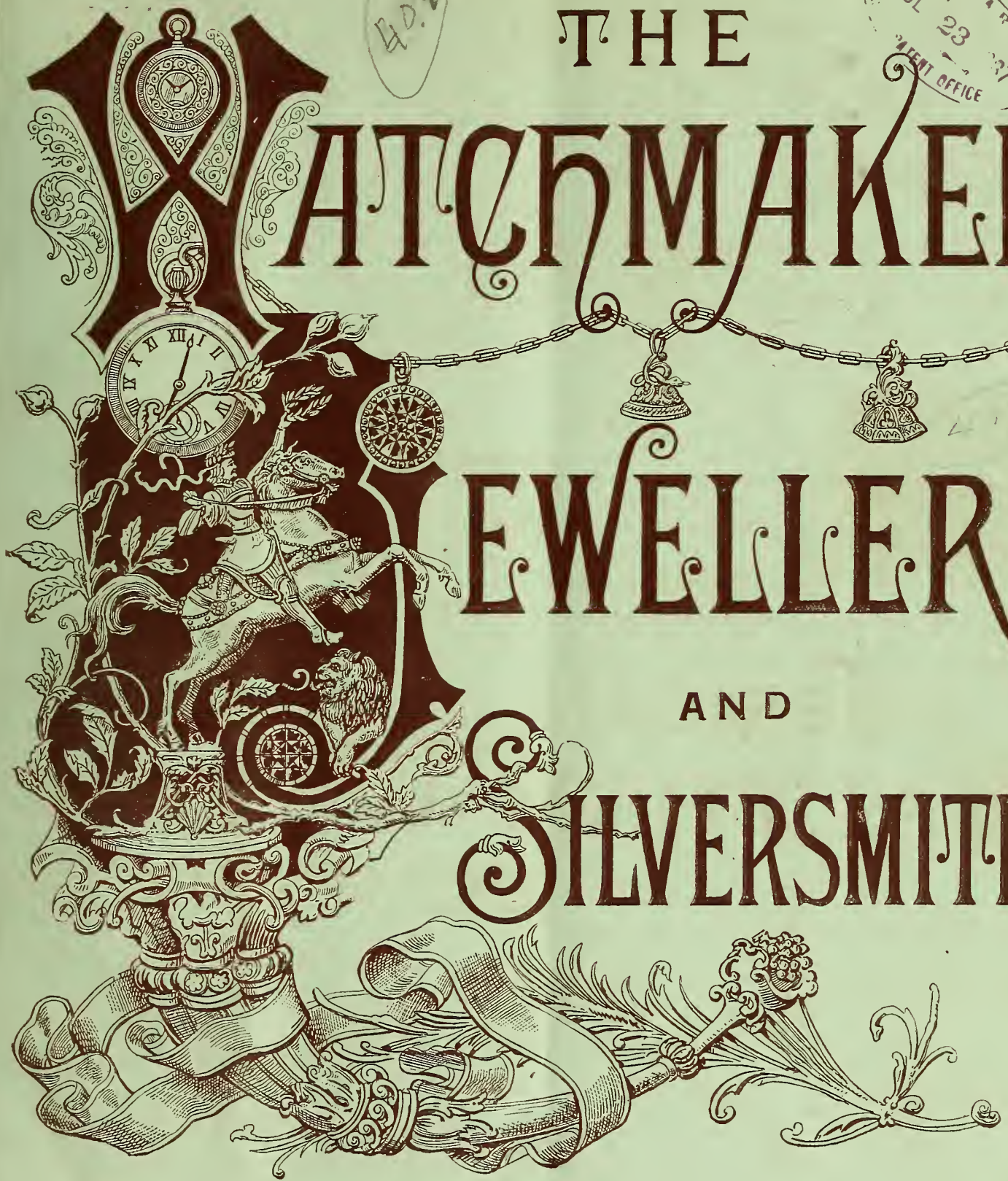
# THE WATCHMAKER JEWELLER AND SILVERSMITH





Office:

IMPERIAL BUILDINGS, LUDGATE CIRCUS,

LONDON, E.C.

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

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## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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## Editorial.

WHILE the members of the watch trade have been discussing the clauses of the Merchandise Marks Bill which relate to watches, and otherwise putting forward their views as to a means of bettering the condition of the English watch trade, a controversy has been going on concurrently among pawnbrokers that, from an outside observer's point of view, presents some common features of similarity; and (besides being of public, as well as special, interest) affords an instructive parallel to the first-mentioned question, as it bears on the subject of trade grievances generally.

Should the debate under consideration serve no other purpose than that of pointing out the ill effects of legislation having for its object the restriction, in any form, of free contract in business, it will not have been without its uses.

Pawnbrokers, in common with other traders, are suffering from the continued trade depression. The assertion may appear somewhat paradoxical to those who hold the popular belief which regards them as battening on other people's misfortunes, but it is nevertheless true; never were there so many businesses in the market, with fewer purchasers, as at the present time, and competent authorities regard the state of affairs as distinctly discouraging.

The discussion that is just now agitating the pawnbroking mind is the result of the proposition by a member of the fraternity for shortening the period during which pledges can be redeemed from twelve months, as at present, to six months. The advocates of the proposed alteration (which it is suggested to bring about by means of an appeal to Parliament) advance numerous plausible arguments in support of their views, foremost among which are the larger amounts that could be lent on articles liable to depreciation from their perishable nature or from changes of fashion, the fewer forfeits that would be left on their hands, and the greater facilities that would be afforded for checking and educating their assistants.

The opponents of the proposed change, on the other hand, state that it would have the effect of throwing a large amount

of idle capital into the tills of the trade, and result in less business being done, and greater losses incurred on account of the still further inducements presented to advance the outside value on articles taken in pledge, with other objections equally cogent.

Without going in detail into the *pros* and *cons* of the case, it will be sufficiently curious to watch the progress of the discussion from the abstract point of view as it affects the interest of a trade more or less intimately connected with those we represent, and not a few of whose members are numbered among the readers of this journal.

The *Pawnbrokers' Gazette*, in commenting on the subject, very pertinently says that this divergence of opinion takes place in the minds of practical men (not mere theorists), every one of whom should be able to form, from his own experience, a perfectly sound judgment upon the point under discussion, and suggests the possibility of discussion leading in time to that unanimity of opinion among all parties, without which it would be improper for a section to take action in that which concerns the whole trade. While fully endorsing the opinion respecting the benefits of discussing trade matters on which widely different views are held, recent experiences do not allow us to be very hopeful of the result. Nevertheless, we shall attentively observe the course of the present debate, and, should it lead to a definitive arrangement being arrived at, carefully note such conclusion for the benefit of those of our readers who are interested in the agitation previously referred to, and to which it bears so strong a resemblance.

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The announcement of the death of Colonel Croll, a short notice of which is given in another column, will be heard with regret by those who had the good fortune to form part of his circle of acquaintances. His never-failing amiability and courtesy to all with whom he came in contact, and his well-known energy of character in business matters excited universal respect. As an esteemed member of the Clockmakers' Co., with which body he was in his later years more particularly identified, Colonel Croll devoted much time and attention to matters purely horological as well as civic, and a good deal of the later action of the Company in endeavouring to promote the welfare of the trades of which they are the corporate head may be traced to his influence. Colonel Croll, who was a native of Perth, first came to London about 50 years ago, where he became connected with several of the larger commercial undertakings in which his energy was speedily conspicuously shown. As Chairman of the United Kingdom Electric Telegraph Co., he was presented by the shareholders, in 1871, in acknowledgment of his services to the Company, with a magnificent testimonial in the shape of a massive silver centre table ornament of the value of 1,000 guineas, which he, a few years since, magnanimously presented to the Clockmakers' Co. as an addition to their museum in the City of London Library.

Colonel Croll was a deputy lieutenant and magistrate for several counties, and member of the Council and Technological Examiner of the Society of Arts. Taking great interest in and successfully dealing with questions relating to educational and commercial subjects, there were few men moving in a similar sphere who had a more honourable retrospect, and his place will not be easily refilled.

# General Notes.

THE PRINCESS OF WALES, on the application of Mr. J. Jacobs, through the Home Secretary, having consented to purchase and wear some articles of jewellery with a view of reviving the Birmingham trade, a case containing a selection of articles from various manufacturers has been submitted to Her Royal Highness, by a committee appointed for that purpose.

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The Jubilee celebrations have not had a very stimulating effect on trade generally. From Sheffield we learn that the cutlery and plating trades have been dull throughout the month, with the exception of a few of the larger firms, with whom Jubilee orders had been placed; and the same partial result is reported from Birmingham, in the fancy industries, and from other manufacturing centres. As for the London West End tradesmen, they not only had to shut up shop during Jubilee week, but were put to considerable expense for decoration; they will, however, doubtless be benefited indirectly by the increase of general business the presence of so many strangers in town is sure to produce.

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The other day a working jeweller named Simpson, in Prince Albert Street, Brighton, met with a strange piece of luck at an auction in that town. A picture of a negro, in an old and dilapidated frame, was put up as a lot, and was knocked down to him "for a mere song," amid the jeers of the brokers and other attendants of the rooms. On the back of the canvas, however, Mr. Simpson had noted, when the pictures were on view the previous day, the words "Dr. Johnson's Servant," and his curiosity being stimulated thereby, he referred to "Boswell" and to the "Life of Reynolds," when he found that Sir Joshua had painted at least one portrait of John Williams, the black servant who was so long in the employ of Dr. Johnson. The style of painting struck several amateurs as rather in the style of Sir Joshua Reynolds, and that view has since been confirmed by one or two experts, who have given their opinion that the portrait is either an original painting by Reynolds, or else a remarkably good copy (possibly a replica) of the portrait which the great master painted for Sir G. Beaumont.

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Mr. John Johnson, of 9, Queen Victoria Street, Mansion House, London, has been awarded the first premium of twenty guineas in the design competition for the clock Mr. Willing intends to present to Brighton. Mr. H. A. Cheers, of Avenue House, Twickenham, has been awarded the second premium of ten guineas. Mr. Johnson's plan will be adapted to the ideas formulated by Mr. Willing and the local authorities.

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Messrs. Buck & Hickman, of 280, Whitechapel Road, London, are showing, at the American Exhibition, the specialties of the following firms:—The Morse Twist Drill and Machine Co., New Bedford, Mass.; the Pratt and Whitney Machine Co., Hartford, Conn.; Messrs. E. Horton, Son & Co., Windsor Locks, N.Y.; the Oneida Steam Engine Co., Oneida, N.Y.; the Cushman Chuck Co., Hartford, Conn.; the Brown & Sharpe Manufacturing Co., Providence, R.I.; Messrs. W. Coupe & Co., South Attleboro, Mass.; the Miller's Falls Co., New York.

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Presentation to the Birmingham Art Gallery.—A large collection of art work was formally presented to the town of Birmingham at a meeting of the Town Council held on June 6. This gift to the local Art Gallery was made by Mr. John Feency, and was procured while he was travelling abroad some years since. The collection, which fills over twenty cases, comprises Japanese and Chinese bronzes, china and enamels, carved ivories, lacquer armour, Indian metal work and jewellery, and objects in silver of old Scandinavian and German workmanship.

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The death, at the age of 76, of Colonel Alexander Angus Croll, a former Master of the Clockmakers' Co., took place at Dunblane, N.B., on the 7th ult.

No gold was coined during the year 1886, the Mint having been exclusively engaged on silver and bronze coinage, the value of the former being £417,384, and of the bronze coins £51,669. The number of half-crowns coined was 994,752, and of florins 592,020: while the shillings struck amounted to 1,774,080, and the sixpences to 2,724,480 in number. The number of three-penny-pieces coined was 6,150,408.

The prospectus of the Glasgow 1888 Exhibition of Industry, Science and Art has been issued by the Committee. Mr. W. M. Cunningham is the secretary, and Mr. H. A. Hedley the manager.

Messrs. James Pinder & Co., of the Colonial Works, Sheffield, have just introduced a useful novelty in the form of an automatic biscuit box. When closed, it takes the form of a corrugated shell. It is opened at either side by pressing one of two knots at the top, and as the two halves fall gradually open, the pierced inside linings rise automatically, allowing of access to the biscuits. In closing the box the linings fall and meet the covers about half-way, thereby preventing the biscuits from falling out. It is manufactured of the best white metal, and is strongly electro-plated; and as it can be obtained plain or engraved in various ornamental designs, it will doubtless command a ready sale, and should engage the attention of the trade.

According to the *Paris Messenger*, a cabman named Wesle may consider himself a victim of the Pranzini mystery. He called at the shop of a watchmaker and jeweller, on the Boulevard de Magenta, under the pretence of having a watch repaired, but in reality to ascertain the value of a diamond, and sell it if possible. The gem was worth about 2,000 fes., and the jeweller being surprised to see a diamond of that value in the hands of a cab driver questioned the man, and not being satisfied with his answers jumped at the conclusion that it must be one of the missing jewels of Marie Regnault, and called in the police. The cabman was then forced to admit that he had found the diamond, an ear-drop, in his cab more than a year ago. It proved to be one lost by the Princess Zoë de Beauvau-Craon, while riding in a cab to the Sceaux railway station. The man has now been sentenced to two months' imprisonment.

Her Majesty's Consul at Batavia reports that in certain instances unauthorised persons have registered and used in the Netherlands Indies trade marks, the property of British firms. To prevent these proceedings, Her Majesty's Consul recommends British owners to empower their agents in the Netherlands Indies to register, on their behalf, such trade marks as they wish protected, and to protest against the registration if it has already been effected by others. The documents necessary are as follow:—(*a*) Power of attorney in favour of the owner's agents authorising them to register their trade mark, and to protest against others registering it. Powers of attorney must first be legalised by a Dutch consular official in the United Kingdom, and afterwards by the Foreign and Colonial Ministers at The Hague. (*b*) Certificate proving the ownership of the trade mark, and that it is duly registered in England. (*c*) Three copies of any trade mark the owner may wish to have registered, with particulars of the class of goods on which same is used. Protests of registration have to be lodged within a year of the original registration.

Cape Diamonds.—In 1883 the export of diamonds from the Cape amounted to £2,742,000, and in 1884 to £2,807,000; but in 1885 it had fallen off to £2,492,000, and some of the companies which had been only moderately successful when the European demand was largest practically suspended operations. Last year the export of diamonds for the year reached a value of about £3,000,000. This is partly accounted for by the larger production, and partly by the fact of the greater size and brilliancy of the stones found in some of the more fully-developed properties.

A novelty in earrings has just been introduced into the American market in the form of a so-called "perpetual motion earring." This device depends upon a double motion: one, a concealed pivoted movement attached to the setting; the other, that acquired from the ring to which the arm of the setting is attached. Iridium bearings secure the parts against wear; and the result is said to be a perfectly safe contrivance, which, never at rest, shows off the stone to the best advantage. The patentees and inventors are Messrs. Edge & Sons, of Newark, N.J., and New York.

Rich gold mines have been found in Eastern Siberia, some few hundred miles from Yakutsk, extending over a district hitherto unexplored. Report declares that the region is a perfect new California in its greatest days of the gold diggings.

It is reported that pieces of gold have been discovered by miners in the bed of the river Mawddach, North Wales; and investigation, it is stated, seems to confirm the statement that the bed of the river is impregnated with gold, which has probably been washed down from the hills. Some fifteen years ago a great rush was made to the neighbourhood of Dolgelly and the valley of Mawddach, where a rich quartz of gold had been found.

Brussels Exhibition of 1888.—The Chamber of Representatives, on the 15th of last month, voted the credit asked for by the Government for the Grand International Exhibition of Arts and Sciences to be held in Brussels in 1888. The sum voted amounted altogether to 2,800,000 fes., of which the greater part is to be expended on the buildings. All the facilities and advantages which the Government proposed to give to the enterprise were also approved by the Chamber.

The glass beads manufactured in Venice form an important branch of industry, 6,000,000 lbs. being exported yearly to all parts of the world.

Robbery of Waterbury Watches and Jewellery.—At Sheffield, on the morning of the 7th ult., the police found that the premises of the Waterbury Watch Co., High Street, Sheffield, had been broken into. The manager was sent for, and it was found that the shopbreakers had climbed the iron gate, entered by the fanlight, and cleared out the silver watches, lockets, chains and purses from the glass case on the counter and escaped. A short time ago a jeweller's window on the opposite side of the street was smashed and valuable property stolen.

The Diamond Market.—No very marked change has taken place in the *Amsterdam* market since our last report; the slightly advanced movement we noticed, however, has continued, and the fears as to polishers being thrown out of work have proved groundless, as the existing factories are fully employed, and there are three new ones in course of construction.

The prices for rough remain the same, and there is some demand for finished among the numerous buyers present, but prices remain unfavourable from the seller's point of view.

There has been a slight change for the better in the *Paris* market since the sale of the Crown jewels, and dealers regard as a hopeful indication the fact of the said jewels realising more than their officially estimated values. Towards the end of the past month the sales have fallen off, and the demand, such as it is, has been mostly confined to buyers from the United States.

The steamers "Athenian," "Norham Castle," "Spartan," "Hawarden Castle" and "Tartar" arrived at Plymouth during the month from the Cape, bringing large parcels of all round stuff from the fields, most of which, as prices were somewhat easier, was speedily bought up by the numerous foreign dealers present.

Latest advices from *Kimberley* report: market quiet, prices easier; yellow at a discount, but good demand for fresh at reduced prices.

Silver.—The latest quotations are: bars 44d., Mexican dollars 43d. per oz.

# Birmingham News.

From Our Correspondent.

THERE has been a great stir here during the last few weeks among the medallists, who have been working day and night, and all the heavy presses in the trade have been swinging incessantly during the 24 hours, striking Jubilee medals; very numerous have been the demands upon any manufacturer possessing a press heavy enough for the purpose, and it is no exaggeration to state that they have been turned out in hundredweights.

* * *

The makers of mayoral chains, civic badges, maces, &c., have been employed in a similar manner, and one of them told me that he was simply tired of working from 5 o'clock a.m. until 12 o'clock midnight (rather a new sensation for a jeweller, these times). Every newly created borough and every ancient borough, large and small, that were not the fortunate possessors of some civic emblem wherewith to adorn the person of their mayor, or otherwise add to their dignity of office, have made vigorous exertions to collect the necessary sum and go in for the much coveted decoration; so that the makers, who are not so numerous as some branches, have reaped a harvest such as they will not see again for some time to come.

* * *

There is not much activity to report among jewellers or silversmiths here in general trade goods; there is every probability of a considerable falling off during the next month, as a reaction from the Jubilee work has already set in, and buyers are very reluctant to place orders until they can see what change is likely in the fashion for the autumn season. There seems to be a strong inclination towards enamelled work as the coming thing, and several makers are already speculating upon new dies for this purpose; no doubt a little pushing may make a success of it.

* * *

If silver continues as cheap as now, or falls even lower still, as appears quite possible, I think it will widen the field for makers of silver goods, as a number of articles might be produced in silver that hitherto have been excluded on account of price, and it is such a beautiful clean metal, that goods made of it would certainly find purchasers. If some enterprising firm will give their attention to this, it may prove remunerative and a blessing to the manufacturing community.

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The Temperature of the Atmosphere at Different Altitudes.—At the meeting of the Meteorological Society, held on the 15th of last month, Mr. W. Marriot, F.R.M.S., read a paper on the "Results of Thermometrical Observations made at 4 feet, 170 feet and 260 feet above the ground at Boston, Lincolnshire, 1882–86." The observations were made on Boston Church tower, which rises quite free from any obstructions, in a very flat country, to the height of 273 feet. A Stevenson screen with a full set of thermometers was placed 4 feet above the ground in the churchyard; a similar screen and thermometers was fixed above the belfry at 170 feet above the ground, while a Siemens electrical thermometer was placed near the top of the tower, the cable being brought down inside and attached to a galvanometer on the floor of the church, where the indications were read off. The results showed that the mean maximum temperature at 4 feet exceeds that at 170 feet in every month of the year, the difference in the summer months amounting to 3 degrees; while the mean minimum temperature at 4 feet differs but slightly from that at 170 feet, the tendency, however, being for the former to be slightly higher in the winter and lower in the summer than the latter. As the electrical thermometer was read usually in the day time, the results naturally showed that the temperature at 4 feet during the day hours was considerably higher than at 260 feet. The author also detailed several sets of readings which had been made during the night, the results from which were of a very interesting character.

# American Items.

THE "Gladstone Testimonial," a large ornament containing 1,000 ounces of pure silver, is now on exhibition at Tiffany's. This magnificent and costly work of art is the gift of many of Mr. Gladstone's admirers in America. It stands 36 inches high, with a width of 22 inches at the base. The testimonial is crowned with a small bust of Gladstone. The pose of the head is majestic, the face is stern yet of pleasant expression, and the design is correct. Immediately below the bust is a pedestal with the inscription, "William Ewart Gladstone, Testimonial Presented by his American Admirers." This is in fancy letters with raised surface and a fancy scroll-work background. In the centre of this part of the pedestal is a laurel wreath surrounding a *facies* and scales of justice, with the words "Home Rule" in prominent letters. On the right side of this pedestal, and standing on the main pedestal, is a female form clothed in a light garment covered with stars. She holds in her left hand an Irish harp, and with her right arm lovingly clasped about the base of the bust, she looks up at the form of Gladstone with a face fixed with deep admiration. She represents the American admirers, and they are beautifully represented. Upon the other side of this pedestal is a large wreath of laurels, and on the back the date of presentation, 1887, is done in a richly ornamented style. Below this pedestal is the base. This is a large oblong block resting upon six feet of Celtic pattern. Its panels are ornamented with emblems. In the centre is represented the "lamp of learning," with the word "Sapientia" in block letters. Over this is the coat-of-arms of Christ Church College, with the words "Double First," which means to the men of this college that he took the first place both in mathematics and classics. To the right of this central group is a wreath with the emblem of justice, and to the left is a similar wreath with the emblem of kind-heartedness. The head of Homer in relief on the left side of the base indicates the classical learning of Gladstone, and that of Demosthenes upon the other indicates his great power as an orator. Shamrocks and stars and stripes are patterned into this testimonial with great skill and artistic effect. The whole piece, which is made solid and of pure silver, is a remarkable example of workmanship, and a work of art that does credit to all concerned in its construction.

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The *Jeweler's Circular* says there is little doubt that the United States will yet be found to be exceedingly rich in all kinds of precious stones. The States, now noted for their gold and silver productions, have been but imperfectly prospected, and their resources are not even suspected. Every little while some miner accidentally stumbles upon some gem, the value of which he does not realise, but, because of its peculiar appearance, he holds for some one to pass upon; and those who have the greatest familiarity with the geological formations of the country, predict that all kinds of precious stones will yet be found in quantities. We have recently seen specimens of rough diamonds and rubies that were picked up by miners in the West, and several jewellers in this city have experts on the alert to pick up whatever is found in this line, and to follow up all indications of such deposits. The Government could well afford to encourage its geologists to prosecute this line of explorations, although experience has demonstrated that private enterprise usually accomplishes better results than any Government prospectors in matters of this kind.

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Silver in a Steel Furnace.—A new line of work was recently taken up by the Edgar Thomson Steel Co., Braddock, Pa. It was found necessary to repair the foundation of one of their furnaces, and while excavating the workmen came in contact with quite a quantity of lead which had worked its way out through the foundation. The lead came from ore used in making the best manganese iron, and as the furnace had been working extensively on this kind of iron, about 50 tons had been deposited. It was analysed by the chemist at the works and found to contain 60 dols.' worth of silver to the ton. In extracting the silver the Company will be well paid for their trouble.

## The Royal Observatory Report.

THE Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, which was read at the annual visitation on June 4 last, has been published.

The present Report, which is very complete, refers to the period of twelve months from May 21, 1886, to May 20, 1887, inclusive, and is divided into: I. Buildings and Grounds, Moveable Property, and Library. II. Astronomical Observations. III. Spectroscopic and Photographic Observations. IV. Magnetical Observations. V. Meteorological Observations. VI. Printing and Distribution of Greenwich Publications. VII. Chronometers, Time Signals and Longitude Operations. VIII. Personal Establishment. IX. General Remarks.

The extension of the two Computing Rooms has been sanctioned by the Admiralty, and provision for the work made in the estimates. The Quadrant Passage is to be included in the Lower Computing Room, and the Upper Computing Room is to extend over the Safe Room, with a central opening and spiral staircase to establish ready communication between the two rooms. Above the extended portion of the Upper Computing Room a dome (18 feet in diameter) is to be erected, in which it is proposed to mount the Cooke 6-inch equatoreal, the photo-heliograph tube being attached to the same mounting. The combined instrument will be carried on a pier to be built on the top of the old Quadrant Pier, and will command a complete view of the sun throughout the day (an important consideration, as the work of the photo-heliograph in its present position is seriously interfered with by trees and the Lassell dome). The 6-inch Cooke refractor will be available for occultations, phenomena of Jupiter's satellites and other occasional observations. It is anticipated that the concentration of the astronomical establishment thus effected will prove of great advantage.

The old instruments and apparatus have been thoroughly overhauled by Mr. Lewis, and those that appeared to be of only historical interest have been transferred to the Library No. 4, the remainder being disposed so as to be readily available for use.

The two Simms equatoreals, part of the mounting of the Corbett equatoreal, a photo-heliograph and two photo-heliograph mountings, two 4-inch detached telescopes (Simms, Nos. 1 and 2), and part of the single prism spectroscope, were lent for use in the eclipse expedition to Grenada last August. Mr. Turner proposes to use the telescope of the Simms equatoreal No. 1 and a small portable equatoreal mounting for the observation of the total solar eclipse of August next, in Russia.

No change of importance has been made in the transit circle beyond the renovation of the recording micrometer apparatus, which was much worn by constant use since 1873.

The personal equation instrument, which is used to determine the personal errors made by observers, due to the individual peculiarity or disposition of each, has not been much used in the past year—partly owing to pressure of other work, and partly because it was deemed expedient, before making an extensive series of observations, to make arrangements for registering the end as well as the beginning of the contacts made by the instrument. With this object a small chronograph, by Krille, has been adapted by Messrs. E. Dent & Co. for electric registration of make and break contacts. The regular subjects of observation with the transit circle are the sun, moon, planets and fundamental stars, with other stars from a working catalogue. A new list of some 3,000 stars was prepared at the end of 1886, to include all the stars in Groombridge's Catalogue and in the Harvard Photometry which had not been observed at Greenwich since 1867. The Annual Catalogue of stars observed in 1886 contains about 1,665 stars.

The following shows the number of observations made with the transit circle in the twelve months ending May 20, 1887:—

| | |
|---|---|
| Transits, the separate limbs being counted as separate observations ... ... ... | 6,366 |
| Determinations of collimation error ... ... | 304 |
| Determinations of level error... ... ... | 410 |
| Circle observations ... ... ... ... | 5,983 |
| Determinations of nadir point (included in the number of circle observations) ... ... | 385 |
| Reflexion observation of stars (similarly included) ... ... ... ... ... | 602 |

About 400 transits (included in the above number) have been observed with the reversion prism, to determine personalty depending on the direction of motion.

The investigation of personal equations in eye and ear transits, as well as in chronographic, has been completed for the year 1886, and the results accord well with those found in the previous year. The practice of observing two clock stars on each night by the eye and ear method has been maintained.

The sidereal standard, mean solar clocks and the chronograph are in good order. Several auxiliary clocks which had not been cleaned for many years have been cleaned recently. Many interesting details are gone into in this section of the Report which our space will not allow of even enumerating.

In Section IV. the Report states that the magnetical observations have been continued on the same lines as in former years, changes in the magnetic declination, horizontal force and vertical force being continuously recorded by photography and the absolute values of magnetic declination, horizontal force and dip being determined from time to time by eye observation.

Earth currents in two directions nearly at right angles to each other are also photographically registered. For these last the ordinates have hitherto been measured on an arbitrary scale, and it appeared desirable to obtain the data for expressing this in terms of the accepted electrical units. The authorities of the Post Office Telegraphs have courteously given their assistance in regard to the requisite electrical measurements, and an electrical balance for measuring resistance, a standard cell and a galvanometer of the Post Office pattern have been prepared under their auspices. In October last, Mr. H. R. Kempe, of the Post Office Telegraphs, made some measures of the resistance of the earth current wires, but the conditions were not then favourable for insulation, and the wires were subsequently damaged by a snowstorm; but it is believed they are now restored to their normal condition, and arrangements are being made to obtain the value of the difference of electric potential between the two earth plates on each line corresponding to a given length of ordinate on the photographic register.

Under meteorological observations it is stated that the continuous registers of barometer, dry and wet bulb thermometers, direction, pressure and velocity of wind, rain, sunshine and atmospheric electricity have been maintained with the usual regularity. The new sunshine recorder, of Professor Stoke's improved pattern, was brought into use at the beginning of 1887, the record with the Campbell instrument being, however, still maintained for purposes of comparison. Experiments were made last summer with the new thermograph and the standard thermometer stand to determine how far it is necessary to screen the thermometer bulbs from possible effect of radiation from neighbouring objects, but the results showed that there was no sensible difference from this cause, and the same result attended experiments with respect to the radiation from the ground.

The mean temperature of the year 1886 was 48·7°, being 0·6° below the average of the preceding 45 years. The highest air temperature in the shade was 89·8° on July 6, and the lowest 16·5° on January 7.

The number of chronometers now being tested at the Observatory is 225, and of these 170 (126 box chronometers, 19 pocket chronometers and 25 deck watches) belong to the Navy, 52 box chronometers are the property of various chronometer makers who have sent them for the special competitive trial, and 3 deck watches have been placed for trial by Messrs. E. Dent & Co, with a view to the selection of two of them to be transferred to the Navy in exchange for some old chronometers. The first seven chronometers in the competitive trial of 1886 were exceptionally good, the first chronometer being superior to any previously on trial except the first in 1882.

The time of commencement of the annual trial of chronometers has been altered to the first Saturday in July, so that the

trial may terminate at a more convenient time for the financial arrangements of the Admiralty. But as it is desired to increase the stock of Navy chronometers without delay, a supplementary trial (for which 52 chronometers have been entered) was commenced on March 5, the rating to terminate on June 18, just before the commencement of the ordinary annual trial.

For the annual trial of deck watches, which commenced last November, fifteen watches were entered, and of these nine were purchased for the Navy, the first three being classed "A," or equal, in performance, to an average box chronometer. A supplementary trial took place in February and March, for which nine deck watches were entered, and of these seven were purchased for the Navy, the first two being classed "A."

The watches in each trial were rated for a period of nine weeks, viz., two weeks (dial up) in the room at a temperature of 50° to 55°, four weeks in four different positions in the oven (dial up, pendant up, pendant right, pendant left, arranged symmetrically) at a temperature of about 80°, and three weeks (dial up) in the room. When the period of rating in any position was less than a week, weekly rates were inferred from the rate for the period by simple proportion.

In order to compare the performances of the several watches, "trial numbers," representing deviation in weekly rates, have been formed on the same general principles as for the chronometer trials. The trials in different positions introduce, however, a new element, and an arbitrary weight must be assigned to them in combining them with the trials "dial up." It has been considered that when the watch is worn in the pocket the pendant will generally be "up," and that not more than one-third of the deviation "pendant right" or "pendant left" is likely to have practical effect. Putting $a$ = difference between greatest and least weekly rates, "dial up;" $b$ = greatest difference between one week and the next, "dial up:" $c$ = difference between weekly rates, "pendant up" and "dial up:" $d$ = difference between weekly rates, "pendant right" and "dial up;" $e$ = difference between weekly rates "pendant left" and "dial up," the quantity $c + \frac{d}{3} + \frac{e}{3}$ may be taken as the measure of the deviation in weekly rates due to positions in ordinary wear. Half weight has been given to this quantity in combining it with the trial number "dial up" $(a + 2\,b)$, on the assumption that the deck watch would be usually lying "dial up," and that it would not be carried in the pocket more than eight hours a day on the average. Thus the quantity $a + 2\,b + \frac{1}{2}\left(c + \frac{d}{3} + \frac{e}{3}\right)$ has been adopted as the trial number for deck watches. It has been arranged that for the future all pocket chronometers and deck watches rated at the Observatory after repair shall be tested in positions.

The following is a statement of the trials of chronometers and deck watches for purchase from the beginning of 1886 to the present time:—Annual trial of thirty-seven chronometers for the Navy, from January 9, 1886, to July 24, 1886; trial of fifteen deck watches for the Navy, from February 15, 1886, to March 6, 1886; trial of two chronometers for the Navy, from July 10, 1886, to November 16, 1886; trial of eight chronometers for the Indian Government, from September 1, 1886, to September 31, 1886; trial of four deck watches for the Indian Government, from September 1, 1886, to September 31, 1886; trial of fifteen deck watches for the Navy, from November 27, 1886, to January 22, 1887; supplementary trial of nine deck watches for the Navy, from February 5, 1887, to April 2, 1887; supplementary trial of fifty-two chronometers for the Navy, from March 5, 1887, to June 18, 1887; trial of three deck watches for the Navy, from May 16, 1887, to July 18, 1887.

In addition to the above, three chronometers have been tested for the Indian Government after being repaired.

The temperature of the chronometer oven has been successfully regulated by Mr. Kullberg's automatic apparatus to the temperature of about 80° for the trials of deck watches as well as to the higher temperature at which chronometers are tested.

In June and July last year, Mr. Lewis spent several days at the Admiralty in comparing the chronometer books kept there with those of the Observatory, and after some trouble a complete accordance was finally secured.

There have been only four cases of failure of the 1 p.m. signal to the Post Office Telegraphs.

The new contact apparatus of the Westminster clock was brought into action on May 22, 1886, and the automatic signals from the clock have been received regularly from that date, except on three days following the snowstorm of December 26 and 27.

The error of the clock was insensible on 25 per cent. of the days of observation, 1′ on 40 per cent., 2′ on 22 per cent., 3′ on 11 per cent. and 4′ on 2 per cent. On one day the signal was 15′ late, and on another day 10′ late.

A suggestion has been made that in view of the importance of the connection of the British and Continental surveys, the telegraphic difference of longitude between Greenwich and Paris, which was originally determined with great care in 1854, should be confirmed in order to complete the network of telegraphic longitudes which have been determined of late years by Continental astronomers. It seems desirable that Greenwich Observatory, which, under Sir G. B. Airy's direction, took such an active part in utilising the telegraph for the determination of longitude, should now assist in completing the cycle. The necessary exchange of observers and signals could conveniently be carried out in the summer of next year, when the French geodetists will, it is understood, be prepared for their share of the work.

A review of the work of the past twelve months shows that the activity of the Observatory has increased in various directions, and while the continuous trials of chronometers and deck watches (requiring special arrangements in each case) have made large demands on the time of the heads of the establishment, extraneous work in connection with the Navy has also absorbed a good deal of time that would otherwise have been free for scientific investigations, respecting which the Astronomer Royal observes that, while it seems desirable that such directly utilitarian work should be undertaken by the Observatory as being the only existing Government establishment where it can be done efficiently, the existing staff is inadequate for these extraneous duties in addition to the well-defined work for which the Observatory is primarily maintained, and suggests an increase of the staff together with the delegation of further responsibility to the present assistants.

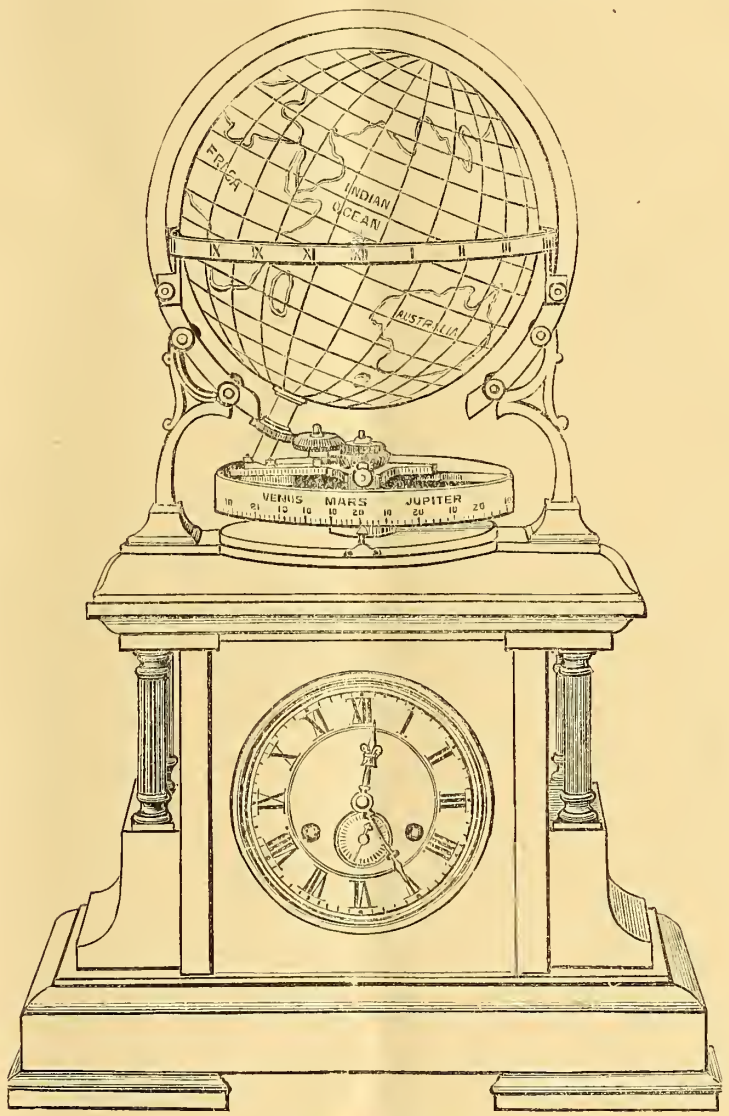
In concluding an excellent and most comprehensive Report, he says:—"Proceeding on the lines which have been laid down by my predecessor, I believe that the maximum of efficiency at the minimum of cost would be attained if an increase of work were met by an increase in the staff of computers, with due recognition of the position of two or three senior computers, and of the increased responsibility of the assistants."

## A New Astronomical Clock.

THE illustration shows a new combination, the recent invention of Messrs. Diette & Hour, of Paris. The construction of this clock is, according to M. Saunier, based on the principle of the Mouret Clock, the inventors having added some accessory indications and modified the disposition of the whole with the double result of producing a more useful and ornamental article at a marketable price, which renders its widespread adoption assured, not only by the chief scholastic institutions, but by all to whom an observation of the conditions under which the celestial phenomena are accomplished is of interest.

The following is the explanation of its functions given by the inventors:—The astronomical clock represents the terrestrial globe, to which the train of the clock communicates the two principal movements of the earth in space: the one, its rotation upon itself in 24 hours; the other, its different positions in its course around the sun in 365 days. The sphere thus driven by

the train of the clock enables us to know its position in space at each moment of the year, and gives us mechanically the explanation of the seasons, the duration of the days and nights, the relative hour upon all the points of the globe, the sun's rising and setting; and, besides, the axis of this sphere carrying a divided circle, whereon are inscribed the dates and months of the year, and the clock giving by a little dial above the six o'clock the days of the week, we have here a complete calendar. A little sun that may be seen in front of the centre of the sphere shows the noon upon every point of the globe passing under his disc. The large arc of the vertical circle separates the sphere into two equal parts: in front it is day (the light part), and at the back it is night (the dark part). We have, then, the indication of day, of night, of sunrise, and of sunset upon all the points of the globe.




A New Astronomical Clock.

The large horizontal circle, divided into 24 hours, permits of the time being ascertained of every country of the globe, relatively to any given place.

To use the apparatus for purposes of demonstration:—By turning the button which may be seen under the sphere, the movement of rotation is obtained. By drawing out the button at the back, the sphere is disengaged from the mechanism of the clock, which allows its being shifted quickly and facilitates the explanation of astronomical phenomena. Thus by bringing March 21 on the calendar under the index, we have the vernal equinox, and the equator will be placed under the solar ray: the star, figured by the little sun, surmounting the horizontal circle of 24 hours. Passing to June 21 we shall have the summer solstice, and the Tropic of Cancer will in its turn be placed under the sun; this is the epoch where, from the meridian of Paris, we receive his rays the most directly. Continuing the movement we shall arrive at September 21, or autumnal equinox, and the equator will return to its place under the sun, but in the contrary sense relatively to the spring time. Placing, then, the calendar at December 21, or winter solstice, the Tropic of Capricorn will come in like manner under the sun; this is the epoch in which we receive his rays most obliquely. In executing this accelerated movement, it may be seen that at March 21 the superior pole is presented in the bright part, in front of the vertical circle, and remains there until September 21, the epoch where this pole goes into the obscure part, or into the night. The contrary is the case for the south pole; one has thus the mechanical explanation of the days and nights of six months in the polar regions.

To ascertain the duration of the day at any date, and for a given town, it is only necessary to bring the point of the calendar indicating this day under the index, and to count the number of hours and fractions of the hour which pass under the little sun during which the said town remains visible in the bright part from its entrance at the left until its exit at the right. The hours of sunrise and of sunset for the same town are similarly obtained; by observing its entrance at the left in the bright part (this is the sunrise), and its exit at the right (dark side), this is the sunset; the little sun serves as the index upon the sphere. The sun rises then for each country when it enters at the left in the bright part, and he sets for those at the right entering the dark part. The 24 hours engraved upon the circle are those for the countries respectively passing it.

# A Short History of the Thimble.

By Herman Bush.

ANENT a bi-centenary celebration, held in October, 1884, at Amsterdam, in honour of the inventor of the thimble, introduced by Nicholas van Benschoten, a gallant young goldsmith, and made in the first instance for the protection of the finger of his fair and industrious lady-love, and its origin, like many other things, attributed to Dan Cupid, a search has been instituted in "Industrial Old Records" to find a priority of the existence of this little and useful article, and the following notes are the result, which are beyond doubt fully authenticated :—

In the year 1568 appeared, at Frankfort-on-the-Maine, a book entitled "Eygentliche Beschreibung Aller Stände auff Erden Hoher und Nidriger Geistlicher und Weltlicher, aller Künsten, Handwereken und Händeln, etc.," illustrated by the renowned German artist of the second half of the 16th century, Jost Ammann, and versified by the well-known German national poet, Hans Sachs, in which we find a direct allusion to the "Fingerhüter" or thimble-maker.

The illustrations of the thimble in this old book are exactly like the thimbles now in use and fully known to every person engaged in sewing by hand. The verses are here produced in the *original old German*, with a free translation annexed—

"Auss Messing mach ich Fingerhüt,
Bleehweiss, werden im Feuer g'lüt,
Dann in das Eysen 'nein getrieben,
Danach Löchlein derein gehieb'en.
Gar mancherley Art, eng und weit,
Für Schuster und Schneider bereit,
Für Seidensticker und Näterin,
Des Handwercks ich ein Meister bin."

*Translation*.—Of brass I make thimbles by cutting discs and anneal in the fire, and then forced hollow into an iron, afterwards provided with little sinks. I make them of various shapes, narrow and wide, for cobblers and tailors ready at sight, for silk embroidress and seamstress and other trades I supply and bless.

As seen in the verse, even *various shapes* of thimbles were known at that remote time.

Jost Ammann's masterly "Beschreibung aller Stände" (Description of all Handicrafts) has recently been reproduced in fac-simile by Dr. Georg Wirth, of Munich, and can be highly recommended to all connoisseurs of old industries and curious manipulations. The noted Amsterdam goldsmith, Nicholas van Benschoten, and his alleged original invention and manufacture of the *finger protector* (thimble) for his sweetheart, can therefore have reference only to the thimble made by him in this instance; and, most probably, more likely to the artistic embellishment of the thimble which the gallant knight of love presented to his fair affianced on her birthday. Yet a far more remote and equally reliable record gives the thimble—this little unpretending, and, for industrious ladies, indispensable auxiliary—an older existence. In one of Adalbert von Keller's (published Shrove Tuesday) plays of the 15th century, he makes the jolly hawker of haberdashery—small wares—announce to the assembled crowd of youths and damsels, men and women, around him—

"Ich han gut Sehnur für's Unterhemd,
Auch hab' ich Nadeln, Bürst und Kämm',
Fingerhüt, Taschen und Schäehtel viel,
Heftlein and Häklein, wie man will."

*Translation*.—I have good tape for the chemise, and likewise, and likewise needles, brushes and combs, *thimbles*, bags and boxes many, handles and crochets for you any.

This is, however, not yet the oldest record of the thimble, which, it appears, was already known in the 12th century.

The Royal Library at Wiesbaden, Germany, contains an interesting manuscript of the 13th century, which brings literary extracts by the Sainted Hildegard, composed in the 12th century. In these curious literary collections we find a compilation of 900 words with a translation in an unknown and lost language. Amongst the words mention is made of Vingerhuth (thimble), which is called Ziriskanz in the strange translation.

In the recent excavations of Herculaneum and Pompeii, which in the year 79 A.D. were overwhelmed by an eruption of the volcano Vesuvius, tiny metal cups were found, which, judging from the shape and size, could hardly be used for any other purpose than a protection of the finger whilst engaged in sewing.

In England, the thimble must have been known and in use for a considerable period, and no doubt in great demand, as we can trace by "London Statistics of Industries" a certain John Lofting, a cunning craftsman, who in 1695 seized on the idea to set up what was then considered a manufactory, consisting of a show-case in the front window of his house, displaying a variety of thimbles, and a small workshop for the making of this specialty at Islington, in the north of London.

Thimbles were readily purchased, not only for use, but for ornament as an emblem of industry and suitable present, and John Lofting enjoyed an extensive patronage which created envy with other metal workers, who soon started improved manufactories of thimbles.

The thimble was first known as a thumble, from a corrupted combination of the words *thumb* and *bell*, and old records intimate that it was originally worn on the thumb, but it appears hardly conceivable that it could have been of much use there. Thimbles were made at that time of iron or brass for ordinary use; of gold, silver, horn and ivory inlaid with gold, mother-of-pearl, glass or highly-polished steel for ornaments, and richly chased or engraved. The embellishment of fancy thimbles were frequently not only highly artistic, but sometimes carried on to such an extent as to make the article unwearable for use.

Relating to the excess of ornamenting the thimble, the young King of Siam recently succeeded in outstripping all competitors in the production of a magnificent thimble as a present to his bride. Having seen the European and American ladies accompanying the diplomatic and naval officers at his court using this useful protection for the finger, he was struck with its benefit and determined to introduce the thimble among his people. Even in Siam they have fashions; and a female leader for such articles as these securing the introduction, he solved the difficulty by ordering a thimble in the shape of the lotus, the royal flower of India. The Queen Consort of Siam owns, therefore, a gold thimble, not only shaped like a lotus bud of exquisite workmanship, but thickly studded with diamonds, which are so arranged as to form the royal name of the recipient and the date of the marriage of the royal couple. As the Siamese language is by no means succinct in letters and signs to express words, it can therefore be readily understood that the diamonds used for this purpose are plentiful; but the use of the present as a thimble is no doubt impaired by its decoration.

In recent years numerous attempts have been made to overcome the almost universal complaint that every shop-keeper is only too familiar with, that *silver* thimbles are not as serviceable and durable as desired, by having too little resisting power when brought into daily contact and use with the needle. Stone ends have been introduced, and steel ones also; each in turn have been condemned as not answering the proffered advantage, and have, besides, been found to be useless to the great majority of wearers who use the sides of the thimble only. To meet this objection, and achieve a thorough success against it, an idea was conceived by a practical manufacturer—an ingenious jeweller of good repute and standing, Mr. Charles Horner, carrying on an extensive establishment at Halifax, Yorkshire—to make a thimble on the principle that may be best described as an *armour-plated silver thimble*, which is made of three separate parts, closely wedged together, the inner and outer parts being silver and the intermediate part steel. The three parts are conjointly struck up together by special machinery made for the purpose, producing a solid resisting power that fully justifies the expression of "armour plated," and becomes for durability unequalled.

These thimbles are made in all the different (and every one plainly numbered) sizes as may be required for the fingers of children or adults, and may be had either in plain finish, or richly chased or engraved in various designs.

This thimble novelty, called "The Dorcas," is protected by Royal Letters Patent by the inventor and manufacturer, and handled with decided success by many respectable firms, who find for the article a continually increasing demand, and requires only to be submitted for inspection and explained to effect a sale to ladies frequenting jewellers' establishments.

# The Albert Medal.

AT the meeting of the Council of the Society of Arts on 6th ult., a letter was read from the Secretary of His Royal Highness the Prince of Wales (the President of the Society), informing the Council that Her Majesty the Queen had intimated to His Royal Highness her willingness to accept the Albert Medal. It was offered to Her Majesty by the Council, with the approval of H.R.H. the President, in this the Jubilee Year, in commemoration of the progress of arts, manufactures, and commerce throughout the empire during the 50 years of her reign.

The following leading article on the award of the Albert Medal appeared in the *Times*, Tuesday, June 7 :—

The Albert Medal of the Society of Arts, for the year 1887, has been awarded by the Council of the Society to the Queen ; and, at a meeting of the Council held yesterday, it was officially announced that the President, the Prince of Wales, had formally confirmed the award, and that Her Majesty had signified her consent to accept the medal. The Albert Medal was founded in the year 1862 as a memorial of His Royal Highness the Prince Consort, who was for eighteen years the President of the Society ; and it is directed by the bye-laws to be awarded annually for "distinguished merit in promoting arts, manufactures or commerce." The recipient may be of any nation ; and it has always been the practice of the Society to take a somewhat wide view of the question, and to look to the indirect, as well as to the direct, results of individual activity. A precedent for the presentation of the medal to a reigning Sovereign was early established—the first award, in 1864, having been made to Sir Rowland Hill "for his great services in the creation of the penny postage, and for other reforms of the postal system, the benefits of which have extended over the civilised world ;"—and the second in the following year, to His Imperial Majesty Napoleon III., for "distinguished merit in promoting, in many ways, by his personal exertions, the international progress of arts, manufactures and commerce, the proofs of which are afforded by his judicious patronage of art, his enlightened commercial policy, and especially by the abolition of passports in favour of British subjects." Of the 21 subsequent awards, eight have been to foreigners ; and it would be difficult to find any greater names among the men who in this country have signalised themselves in the arts of peace. Faraday, Cooke and Wheatstone (jointly), Sir Joseph Whitworth, Liebig, de Lesseps, Sir H. Cole, Sir H. Bessemer, Chevreul, Sir W. Siemens, Michael Chevalier, Sir G. Airy, Jean Baptiste Dumas, Sir W. Armstrong, Sir W. Thomson, Professor Hofmann, Pasteur, Sir Joseph Hooker, Captain Eads, Henry Doulton and Samuel Lister complete the tale ; and it will be seen that the principles governing the selection have been of the most comprehensive character. The award to Her Majesty expresses the conviction of the Council that the 50 years of her reign have been such as to foster art and industry, to elevate taste, and to establish conditions which have rendered the conquests of science more accessible to all ranks, from the highest to the lowest, than they could have been in any less favourable circumstances. The throne has been so filled as to increase the strength and stability of the national fabric, and the personality of the Sovereign has been a potent agency in the promotion of every good and useful work. The Queen's acceptance of the medal will confer additional lustre upon it and upon the Society, as well as upon all who in future years may be distinguished in a similar manner.

The award of the Albert Medal, which, in the nature of things, can hardly be received otherwise than as the crown of a long career of usefulness and honour, can hardly be said to exert any active influence in the promotion of the efforts which it serves to mark and to commemorate. It is, nevertheless, a fitting thing that the selection of the recipient should be entrusted to the Society of Arts, a body which has been active for good during what is now, comparatively speaking, the long term of its existence. Many of the most important industrial steps of the century have been first made known at the meeting-room in the Adelphi, either by those with whom they originated, or in the many and various lectures which have been delivered under the endowment of Dr. Cantor ; and the Society has been no less useful by the manner in which it encouraged technical education long before the necessity for such encouragement had come to be recognised by general public opinion. Nor must it be forgotten that the organisation which it possesses is such as to afford very complete securities against the neglect of any kind of merit. The Council, with whom the selection rests, is itself recruited from a very wide field, and always contains representatives of many kinds of knowledge ; while it has been the praiseworthy custom to ask for the suggestion of names not only from members of the Society of Arts itself, but also from foreign academies and institutions, and from the councils and presidents of English learned societies. In this way it is scarcely possible for any valid claim to be overlooked ; while an additional security is afforded by a bye-law which requires the presence of twelve members of the Council when the award is made, and the concurrence of nine of them in the selection. Besides this, the award must be confirmed by the President, with whom there therefore rests, by implication if not explicitly, a power to object, and to require from the Council a statement of the considerations by which they have been guided. It can afford no surprise that a distinction thus safeguarded should be a matter of high ambition among all who have any kind of claim to aspire to it ; and the recommendations of both English and foreign learned bodies have been frequently made with an earnestness which sufficiently demonstrated their feeling upon the subject. It has been the custom that the medal should be given by the President in the presence of the assembled Council ; and a meeting for this purpose has usually been held at Marlborough House ; but it will be in the recollection of our readers that the Prince of Wales conferred upon Mr. Doulton the honour of going to the works at Lambeth, and of giving him the medal in the presence not only of the Council, but of the assembled artists and potters in his employment. Of the ceremonial which will be observed on the occasion of the presentation to the Queen it would, of course, at present be premature to speak.

It would be impossible to glance over the list of persons which we have given above without some consideration of the mighty advances in human knowledge, and the vast additions to human welfare and convenience which have been the direct issue of their labours. The Albert Medal dates only from the last half of the reign, but what changes does it not commemorate ! Before its establishment worthy recipients had, so to speak, accumulated : and the first awards were to men whose work was already in great part finished. Rowland Hill, Faraday, Cooke, Wheatstone, de Lesseps and Thomson collectively represent the changes which have occurred in the methods of communication between individuals and countries, or the rise of the present postal, telegraphic and telephonic services. Whitworth represents the accuracy of measurement which has rendered it possible to make the parts of machinery interchangeable, or to construct from written descriptions a portion of an engine which may be conveyed to the Antipodes, and fitted into its allotted place. Liebig, Chevreul, Dumas, Joule, Hofmann and Pasteur represent the influence of physical science, sometimes in its most abstruse forms, upon the actual management of industries which afford maintenance to thousands of people. Bessemer, Siemens and Armstrong represent practical metallurgy ; Hooker represents the utilisation of innumerable vegetable products ; Cole, the Science and Art Department and the South Kensington Museum ; Chevalier, the influence of political economy ; Airy, the increased safety of navigation ; and Eads, the advances which recent years have witnessed in the maintenance and improvement of waterways. There is not one of these great developments which does not serve to lighten the daily life of every inhabitant of any civilised country, which does not increase comfort, afford pleasure, and cheapen necessaries. At the rate of modern progress there need be no fear but that each recurring period of election will bring to the Council of the Society of Arts an embarrassing abundance of fitting claimants rather than a scarcity of them ; and there can be no doubt but that the gracious consent of Her

Majesty to add her name to the illustrious list of the recipients will greatly enhance the future value of the award. While those who have already received the medal represent, as we have said, the departments of science or of industry in which they have become famous, the Queen may be held to be in this case the personal embodiment of the nation, and to represent the aggregate of its work. In her hands the medal will be a fitting memorial of the beneficial changes which have occurred since she assumed the sceptre, and of the multitudinous benefits which her people have received under her sway.

## Machine for making Watch Cases.

MESSRS. KELLER & GRÜRING, of Bienne, Switzerland, have invented and patented a very ingenious tool for making the different parts of watch cases in gold, silver or other metals, which is said to execute the work with great rapidity, without solder, and almost without waste. As the cut shows, it is very simple. It consists of the following parts :—An arbor which carries a pulley and a dummy pulley, so that a movement of the hand throws the arbor into or out of action. This arbor receives at its hollow end four segments of a circle presenting exteriorly the exact form of the inside of the band or middle of a case ; a cylindrical chuck fixes by a vice the exact pressure to be applied against the side of the hole, and at the same time holds the disc that has been previously pressed into the roller and which is destined to form the middle. A wheel, having the exterior form, but in hollow, of the middle, is carried by a chariot held in a vice ; and, lastly, another wheel neutralises the pressure on the arbor of the first wheel.

The disc of gold, silver, &c., is made slightly convex to facilitate the work, and fixed at the extremity of the arbor; the last is put in motion, and the chariot approached to it, which forces the metal to take the form of the moulds. The form of the band, the snaps for the bottoms, the cover and the recess for the dial are all made at a single operation. The interior moulds are composed of many pieces, coming thus easily out of the middle. A similar machine is used for making the bottoms and the bezels. A middle is completed in one minute ; the work being clean and without burr.

Messrs. Keller & Grüring have patented their invention in all countries.

## Society of Arts Conversazione.

THE Society's Conversazione was held at the South Kensington Museum (by permission of the Lords of the Committee of Council on Education), on Wednesday evening, June 15.

The galleries containing the Raphael Cartoons, the Sheepshanks Collection, the William Smith Collection of Water Colour Drawings, the Dyce and Forster Pictures, and "The Chantrey Bequest," were open.

The reception was held in the South Court by Captain Douglas Galton, C.B., D.C.L., F.R.S., Chairman, and the following Vice-Presidents and Members of the Council :—Mr. R. Brudenell Carter, F.R.C.S., Mr. Charles Cheston, Mr. Francis Cobb, Mr. T. R. Crampton, Sir Juland Danvers, K.C.S.I., Professor Dewar, F.R.S., Colonel Donnelly, R.E., Mr. W. H. Preece, F.R.S., Sir Robert Rawlinson, C.B., and Mr. Owen Roberts.

Promenade concerts were given by the band of the Royal Artillery (Conductor, Cav. L. Zaverthal) in the North Court, and by the band of the Royal Horse Guards, Blues (Conductor, Mr. Charles Godfrey), in the Courtyard of the Museum; and a vocal and instrumental concert by scholars of the Royal College of Music, by permission of the Director, in the Lecture Theatre.

The number of visitors attending the Conversazione was 3,800.

## Silversmithing.

IN an original article written for the American *Manufacturing Jeweler*, this subject is treated in a very able and interesting manner; and, as the extent to which the American taste in the applied arts has been developed of late years is but very partially realised in this country, a reproduction of the principal part of the article may be useful for purposes of enlightening our own producers in more than one way :—

Silversmithing and goldsmithing originally comprised the art of working in all the precious metals, embracing, therefore, jewels and jewellery as well as the larger pieces pertaining to the table, instruments, sacerdotal utensils, &c. It is to the larger pieces of silversmithing proper, however, that we devote this encyclopædic monograph. The art of giving rich and beautiful forms to gold and silver is one of great antiquity. The products of the silversmith were extremely remarkable in Asia, Egypt, Phœnicia, Judea, Greece and Rome. In comparatively recent discoveries we are furnished with a great number of objects of Egyptian production which enable us to form a just and nearly correct idea of this work among them in the most remote times. The museum of the Louvre contains a beautiful group in gold which represents the Egyptian Trinity (Osiris, Isis and Horus). Another remarkable work of this character is a boat found in the tomb of Aah-Hotep with a quantity of other precious objects in gold and silver, such as rings, armlets, bracelets, collars, chains, diadems, pectorals, &c. The boat is of massive gold, and furnished with its crew ; in the bow stands the pilot, amidships twelve rowers with their commander, and in the stern the helmsman : these figures are all in silver. The museum of Boulac possesses Egyptian vases of silver of the greatest antiquity, contemporaneous perhaps to the great quantity of articles in gold and silver which the Israelites carried away in their exodus, and which proves that the art existed in the country at that time. Sometime after the exodus, the Israelites having demanded of Aaron that he should give them a peaceful God, they collected the jewellery of the women and maidens and made the golden calf. Moses returned from Sinai with the tables of the law, and indignant at their return to idolatry dissolved the calf in acids—at least, so says the German savant, Klaproth. After the Jewish people, we read in Homer that among the rich presents which Priam gave for the body of his son Hector, there were two magnificent tripods of a work so remarkable that it dazzled the eyes, and also many vases of great richness, and a cup of infinite price which was received from the Thracians at the time when he was sent to them as an ambassador. We see furthermore in Homer that Menelaus and Helen received from Egypt pieces of silver work decorated with gold; and from the same author we learn that the sword of King Agamemnon had a handle of gold, and the description of the shield of Achilles gives also decorations of gold and colours finely chased. The women of Athens at a period of great antiquity carried in their hair grasshoppers of gold—a symbol indicating that they were of good birth, and, like that insect, born on the soil of Greece. There is in the museum of the Hermitage in St. Petersburg a superb Greek vase of silver, found near Nicopol, in 1863, in a tumulus. Its form is that of an amphora, and its date the 4th century B.C., which was the most beautiful epoch of Greek silversmithing, as the rich and exquisite ornamentation clearly shows. Some of the *repoussé* work is gilded. It was designed for holding the wine mingled with snow which they served at their feasts.

The Romans borrowed of the Greeks the art of silversmithing as they borrowed everything else in the line of art. In Rome the silver work of Delos was very highly estimated, and consequently very much sought after. Under the empire the table utensils as well as many articles of furniture were of gold or silver, and they existed in great abundance. These vases, cups and *pateras* were in daily use, and served to emphasise the extravagant luxury that everywhere prevailed. We get an idea of the merit of these works of art from the specimens preserved in our museums, such as the vases of the Cardinal Albani, which represents the atonement of Orestes and the labours of Hercules, and also the two

celebrated pieces known as the shield of Scipio and the shield of Hannibal. It goes without saying that a vast store of these objects have perished in the wars and in the conflagrations. It is also known that the great number that Rome had pillaged from the barbarians and taken to Rome in order to make a display of booty were retaken from her again by her uncivilised enemies when she succumbed to their inroads at a later date. This may explain why certain pieces of Roman silversmithing have been found far from the Roman territory. For instance, they have unearthed in Hanover, in the environs of Hildesheim, about 45 objects of undoubted Roman production, and which comprise drinking cups elaborately decorated, urns, *pateras*, utensils of the table, &c.

The Roman art of silversmithing was perpetuated in Europe until the 5th century, and that the production was enormous we may learn from the fact that in the first years of our era, according to Posidonius, Q. Servilius Capio took possession of the treasures of the Tectosages preserved in Toulouse, which were valued at 15,000,000 talents (about 17,000,000 dols.). In the 6th century the most renowned school of silversmithing in Gaul was located at Limoges, where the art of enamelling had already become pretty well advanced. Eligius (St. Eloi), who was born in Chatelac in 588 and died in 659, was a noted artist and also an excellent caligrapher. He executed not only silversmiths' work, but also metallic bookbinding. Eligius had been successively bishop of Abbon and citizen of Limoges and of Thillo. He had besides frequent relations with another silversmith, named Banderic. Of the 7th and 8th centuries and until the 11th, that is to say under the Merovingians and the Carlovingians, it is granted that all the works of silversmithing are works of the so-called barbarians. In the meantime our museums contain specimens of silversmithing of these epochs which testify of the skill and the style of the artists by whom they were executed : for example, the Scythian diadem of Novo-Tscherkask, the objects composing the treasures of Petrossa and of Guarrazar, the cross said to be by St. Eloi, the crown of Charlemagne, and all other remarkable and well-known works of Byzantine enamelling. In the 11th century the silversmiths made chiefly objects which were used in the churches : the sacred vessels and shrines. Paris and Limoges occupied the first rank in the fabrication of these articles, the makers – after John of Garland – being divided into four classes : the coiners, the jewellers, the *fermailleurs* and the makers of drinking cups The establishment of the corporation of silversmiths belongs to a period so remote that its date is unknown. The most ancient documents which we have tend to demonstrate that this corporation existed some time before the reign of Louis IX., about 1260. This body of silversmiths, which enjoyed certain prerogatives, was also charged with hindering the progress of the art. During the 12th and 13th centuries silversmithing was in the ascendant. Limoges produced a great number of pieces which were called "works of Limoges." Among the pieces preserved in the cathedrals the works of Limoges made during the 13th century are very easily distinguishable from the earlier objects on account of the imprints or stamps.

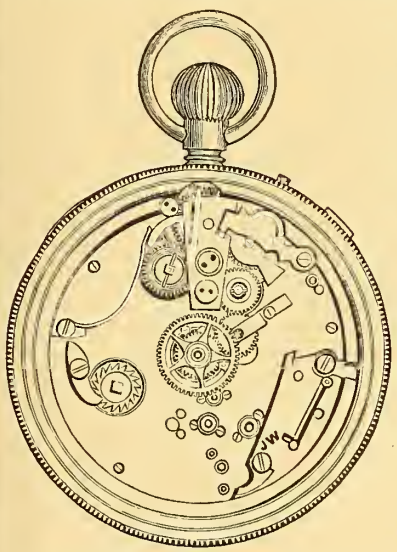
The shrines of this epoch are veritable Gothic boxes, as we may say, notably in the shrine of St.-Taurin of Evreux, that of St. Julie, à Jouarre, and especially that of Nivelles. The commencement of the 16th century was a period of great depression in silversmithing, for the wars which exhausted France at this epoch forced Louis XII. to sign an edict forbidding all the silversmiths making any pieces, vessels, shrines, table utensils, &c., without previous authority ; but some years after the accession of Francis I., about 1528 or 1530, silversmithing, which was flourishing in Italy, made progress in France by reason of the patronage of Francis. Painters like Leonardo di Vinci, the Primatice, the Rossa, and jewellery silversmiths like Matteo del Nassaro, Benvenuto Cellini, and many others who had been called to the court, strongly stimulated the emulation of the French artists. The last named has almost become the patron saint of the silversmiths to this day. Among others might be named Pirame Triboulet, Pierre Mangot, Benedict Ramel, Etienne Delaune, F. Dujardin, F. Briot, Jean de la Haye, &c.

At the commencement of the 17th century, silversmithing attained its zenith, and realised the greatest perfection in France. Among the artists of this epoch we find Louis Roupert, of Metz, but who worked in Paris and made there a reputation. This is the period also of Ballin, who at the age of 29 made four basins of silver, upon which figured the four ages of the world. These basins were bought by Richelieu, who ordered four others of antique style. The sculptor Sarrasin, astonished at the talent of the young silversmith, chiselled him divers bas reliefs. Ballin worked also in enamelled gold the first sword and the first gorget of Louis XIV., and a mirror of gold for Anne of Austria.

We have followed the art into France because it was the country that first received it from Rome, but other countries made a more pronounced progress in the 15th and 16th centuries, particularly Italy. Germany caught the inspiration of the renaissance a little late, but she retained it longest. Of pieces produced near the beginning of our era the collection unearthed in the Bosphorus, and at present treasured in the museum of the Hermitage at St. Petersburg, gives a good idea of not only the finer Grecian work, but also the more barbarous styles of the early inhabitants of Russia. Reproductions of most of these are now in the Metropolitan Museum of Art in New York.

## Skelton's New Fusee-Keyless Work.

WE illustrate a new winding arrangement for fusee watches, which is the invention of Mr. M. W. Skelton, of Park Place, Liverpool. It is similar in principle to the Kullberg and Chalfont windings, and seems to have the elements of a good fusee-keyless work, viz., strength and simplicity. The intermediate wheel gearing into the winding pinion is carried on a moveable bar and comes into action with the wheel on the fusee arbor when the button is turned in the direction of winding, being kept free from the latter wheel when not thus in use by means of a spring pressing against the bar. Two screws or studs keep the bar in its place, the lowermost shown acting as the pivot of the rocking bar, while the upper one, besides preventing the bar from rising from the plate when undue pressure is applied to the winding button, permits of the adjustment of a good depth between the intermediate and fusee wheels.



Skelton's New Fusee-Keyless Work.

The second rocking bar, which carries the wheel for setting the hands, has a projecting hook, which, on pushing in the push-piece, locks the first bar in its place and prevents it from going over to the other side, and the wheel from getting out of gear with the set-hand and motion wheels.

"The European Mail" and "The Colonies and India."—The success of the "Industrial Supplement" which has for some years past been published with these allied journals—now numbering 242 issues annually—has induced the proprietors to start another novel addition in the form of a "Household Supplement." This will be published for the first time in July, and the fact that it is to be edited by Mrs. Carey-Hobson and Miss Buckland is sufficient proof that it will contain all that is latest, most interesting and most serviceable in matters appertaining to the family circle. A serial story, specially written for the Supplement by Mr. Percy Russell, will be an additional attraction.

## Watch Oils.

A CORRESPONDENT of the *Deutsch Uhrmacher Zeitung* writes:—Where can we get a good, serviceable watch oil? This question forces itself upon the watchmaker every little while, after he has found out, to his vexation, that the oil which he employed for some time does not comply with the reasonable expectations made of it; and the question will be an open one until we are furnished with an oil that shall answer all reasonable demands, and is recognised as serviceable by the majority of watchmakers. Some of the oils found at present in commerce are open to one objection, the others to some other one. What with these shortcomings and defects of oils, the watchmaker is constantly in a "sea of trouble" with his customers, who blame him for careless work.

The queries as to some brand of oil are frequently answered in different manners by colleagues. Its faults are often wittingly withheld, for reasons of delicacy, and the interrogating watchmaker who, by the insufficiency of the lubricant he customarily employs, is forced to change it for some other make, will after all have to depend on good luck with the next lot.

But why trust to good luck? Most surely the oil can be tested for its quality before it is used, many a watchmaker will rejoin. He will ever prescribe the "*modus operandi*" for doing it. Place a few drops of it upon brass or copper in small sinks or gutters upon an inclined plane—a custom universally employed—and from the result you may form a judgment of its different virtues: whether it is too viscid or too liquid, whether it attacks the metals, whether it is inclined to volatilising, thickening, drying or other vexations: whether it congeals in the cold, or when brought between two metallic plates it becomes sticky. If none of these evils are visible after the course of several days or weeks, the oil is deemed to be very good, and is without further thought taken into use.

Also, I have observed this mode of testing, and deducted my conclusions therefrom, having at present nine different sorts of oil under test on brass and copper. But I have recently found out how unreliable this mode is, and I deem the experience I gather important enough to be published for the information of my colleagues, at the same time soliciting them, in case their observations should coincide with mine, to also publish their deductions.

I have arrived at the conclusion that one sort of oil which retains its fluidity for years in brass holes becomes viscid in the same length of time in the jewel holes of the same watch, and that another brand of oil possesses the exact opposite properties. To what purpose, therefore, is a test upon brass by which we do not obtain information how the oil will behave in the jewel holes?

I will illustrate by facts. About two years ago our two shop regulators—which is equal to saying two astronomical clocks executed in the most careful manner—were cleaned, and an oil labelled as "Finest Animal Oil for Chronometers and Watches" was used for lubricating. Both clocks at first preserved good rates, but gradually retarded to such a degree that it became at last necessary to take them down. The oil in the jewel holes (of finest rubies) was completely dried up—it was as thick and brown as cold carpenter's glue—while in the brass holes, although being light green, it was perfectly fluid and capable of rendering good service for years. The pivots working in the rubies, as well as the shoulders, and even a part of their arbors, were completely black, while those in brass had preserved their polish. I would also add that one of the clocks was about eight months ago oiled again with an oil of a very renowned German brand. The condition of the oil in both clocks was exactly the same. I would also state that the temperature in our shop is very variable; we have sometimes 10° R. in the morning and 20° R. in the evening. This, of course, has also a deteriorating effect upon the oil; but why to such a degree I cannot understand.

Another observation with an English oil I made, and found that it acted in the contrary way, as I have observed in a great many watches. While the oil in the jewel holes is limpid and fluid, it becomes thick and black like tar, and attacks the pivots. (I have met with cases where it acted thus in less than six months.) If a watch came back, I knew that the pivots were to be polished and the holes bushed. What was the reason of this? It is almost unnecessary to mention that the blame could not be laid to the workman. Our shop employed twenty repairers, and every one was required to perform his work with the utmost painstaking.

Although it is sufficiently well known that the quality of the brass exerts an important influence upon oil, I will nevertheless mention an occurrence which happened to me lately. I had, as I said above, nine kinds of oil for testing upon brass. Among these was also a sort which I have employed for watches for years, and have often lubricated with it a small so-called French regulator, which had gone eleven full years before it was cleaned, and it was then only due to the accident that the spring had become unhooked. The oil had not thickened in the least, but was inclined to volatilise, wherefore I re-supplied it every two years. After cleaning (both the pivots and holes had been preserved perfectly during this time) I again used the same oil. The oil tests upon brass I performed four months afterwards, and imagine my astonishment, when after a few days the same oil, which I had applied in four little sinks, had turned full green. I at once took down the movement of said regulator to examine its condition, and found that its oil was perfectly clear, and did not exhibit the least trace of assuming a green colour. Consequently the fault was due to the brass I had chosen for instituting the tests. It is very possible in this manner to pronounce an oil as useless while it possesses good, useful qualities.

I reiterate the solicitations to my colleagues to publish their experiments and experience in this line. The subject is of too grave a nature to be treated slightingly or silently.

## Mayoral Chains.

AN important chain and badge for the borough of Bridgwater has just been manufactured by Messrs. T. & J. Bragg, of Birmingham. It is in gold of 18-carat quality, every link being Hall-marked, and connecting links, formed of the initial of the name of the town, are joined to larger links with mural crowns and escutcheons. These escutcheons, eighteen in number, contain the names in succession of as many mayors and magistrates or officials of the borough, dating from an early period. The centre link has in circle the monogram of Mr. Alfred Peace, J.P., the present mayor, in gold letters upon a crimson enamelled field with the dove crest over it, and motto, "*Memor et fidelis*" below. The badge, which is of a circular form enriched by graceful scrolls, has the cognisance of the borough (the triple-towered castle upon a bridge of three arches), as in the old civic seal. The town, whose first charter is dated A.D. 1200, carries us back to the castle period of corporate history, and is, with the legend, rendered in a very interesting manner. Over this is the *corona muralis*, signifying a walled tower, and the national wreath of oak and laurel. The civic fasces and the mace, as municipal symbols, are placed crosswise beside the borough seal, and the whole work is carried out in a thoughtful and artistic style.

A VERY superb chain, royal medallion and badge of office has just been manufactured by the same firm for Pembroke. It has been subscribed for by the ladies of the town and district as a Jubilee gift to the corporation. The chain has a double link connection, giving a particularly rich effect in wear, the larger divisions being occupied with crusader shields, in reference to the period of incorporation of the borough. These shields are surmounted by civic coronets having a significant relation to the mayoral office, so that the shields will become an appropriate and continuous record of successive occupants of the civic chair. As Henry VII., styled Henry of Pembroke, was born in the castle which then defended the town, his coat of

arms in enamel blazon, surmounted by the beautiful British crown of that age, forms an excellent centre link to the chain; the crossed leeks of Wales, in correct colours, beside it completing this portion of the decoration. Beneath this depends a charming gold oval medallion with a border regarding the present year of the Royal Jubilee, and having in centre an enamelled painted miniature portrait of Queen Victoria. From this is suspended the large badge of the borough itself, in massive gold, most elaborate in detail. The general form is circular, the arms of the corporation and legend, as on borough seal, enamelled in centre, round which four sportive dolphins, in open *repoussé* work, are arranged, giving much lightness and beauty to the effect. The civic mace and fasces in saltire are carefully wrought, being, as to the second circle, a framed border of British oak and laurel. On this border are four subsidiary medallions facing the points of the compass, and giving, in as many coats of arms, the periods of the historical charters of the town. First comes that of Gilbert Strongbow, Earl of Pembroke; next that of King John; again, that of Henry VIII.; and, lastly, the modern one, indicated by the arms of the reigning sovereign. Foliated terminals give a graceful line to the border. The work is carried out with artistic fidelity, and has given the highest satisfaction to the Committee.

As the Royal year of Jubilee is, in the case of Llanidloes, the Jubilee of the incorporation of the borough under the Reformed Corporations Act, a very handsome Mayoral Chain has been subscribed for, and the work has just been completed, also by the same firm. It is of gold, Hall-marked; and the larger links, of rich renaissance form, each bear gold tablets on which may be engraved at each election the names of successive occupants of the civic chair. The centre link, which is larger and supported by maces, bears in an enamelled escutcheon, in centre, an elaborate monogram recording the Borough Jubilee. The badge, of large proportions, has the Corporation arms in centre: lion rampant argent, on a field ermine with a bordure gules. Over this is the name of the borough, in gold letters on a ground of blue enamel, and surmounted by the mural coronet. The Welsh leeks crossed below the shield are admirably rendered, and on a riband entwined about them it is recorded that the town is a borough by prescription. Beside the shield are two croziers relating to Llanidloes as a seat of ecclesiastical authority. A long inscription on reverse of badge completes the decoration, which will be a worthy and fitting memorial of the occasion.

## Mayoral Badge for Wokingham.

THE celebration of the Royal Jubilee has led to the acquirement by many corporations of permanent records in the form of civic insignia, and the pretty badge made by Messrs. T. & J. Bragg, of Birmingham, for Mr. Thomas M. Wescott, Mayor of Wokingham, is one of the most interesting. It is in general outline a heart shape, and the place of honour is given to the beautifully painted miniature portrait of the Queen in enamel colours upon fine gold. Surrounding this is an oval border also enamelled, with words recording the Jubilee. Wokingham (or Oakingham, as it is believed to have been originally named) has for its borough device a spray of oak; therefore the designer has arranged a continuous wreath of oak at the sides of the royal portrait, and by a happy mixture of alloy the gold, which is of 18-carat quality throughout, is so combined in the leaves of the oak as to give a greenish effect as compared with the yellow tint of the remaining portion. Over the Queen's miniature is placed the royal crown, surmounted by the British lion, also crowned—the crest of England. The sceptres come in at the sides, the name of the borough on a riband in enamel; a rich border completes the ornament, which depends from an appropriate gold centre with mural crown over, and the initials of the mayor given in gold letters on an enamelled field. Several additional gold links lead to the wide ribbon of royal blue by which the decoration is suspended. The whole has been finished in best style, and will form a memorial of the year in every way worthy of the event.

## Workshop Memoranda.

Powder for Silver Plating.—Mix 1 part chloride of silver with 3 parts pearlash, 1½ part common salt, and 1 part whiting, and rub the mixture on the surface of brass or copper (previously well cleaned) by means of a piece of soft leather, or a cork moistened with water and dipped into the powder.

An alloy of copper, 15 parts; tin, 2·34 parts; lead, 1·82 parts; antimony, 1 part—forming a bronze with the addition of lead and antimony—practically resists the attack of most acids and alkaline solutions.

Gilding Solution.—A gilding solution is thus described in *La Monde de la Science:* Crystallised phosphate of soda, 60 parts; bisulphide of soda, 10 parts; cyanide of potassium, 1 part; chloride of gold, 2½ parts; distilled or rain water, by weight, 1,000 parts. To prepare this bath properly the water is divided into three portions, namely, one of 700 and two of 150 each. The sodic phosphate is dissolved in the first portion, the chloride of gold in the second, and the bisulphide of soda and cyanide of potassium in the third. The first two portions are gradually mixed together and the third is afterwards added. With this solution the artisan uses a platinum anode—a wire or strip—adding fresh portions of the gold salt as the solution becomes exhausted.

Simple Method of Silvering.—The following, given in an American journal, is an expeditious way for silvering metallic articles. Freshly precipitated chloride of silver, after it has been thoroughly washed with hot water, is mixed with equal parts of table salt and cream of tartar, transforming it into a thin paste by adding water, if necessary. The article to be silvered is first well washed with a hot soda solution and soap and a stiff brush, in order to remove all dirt, and it is next to be rinsed thoroughly in hot water. A second day cleaning with fine washed chalk, pumice powder or quartz powder, is to be recommended. After having been well rinsed with cold water, and before drying, it is coated with finely pulverised table salt, so that the article is covered with a thin layer; a little of the silver paste is next rubbed on, whereby its surface to be treated is well and uniformly silver-washed. This treatment is quickly followed by rubbing in a little cream of tartar, which is also to be applied with the same kind of ball, and it is finally washed. The coating is very handsome, clear, and as white as snow.

A solution of hyposulphite of soda, applied with a soft brush, is said to be one of the best means of cleaning silver or silver-plated goods. No powder being necessary, there is no fear of filling the chiselling or other intaglio ornamentation. When powders are not objectionable, tripoli may be employed with or without ammonia. In place of tripoli, the fossil silica (found in this country and sold under a variety of names) serves an excellent purpose.

Distillation and Purification of Mercury.—It is generally accepted that mercury cannot be fully purified by distillation, and by earlier observations the author of an article on the subject in a Berlin journal had found that these distillations left crude mercury quite impure. Some experiments have now been made to ascertain whether the foreign metals are vaporised with the mercury, as water vapour carries over other substances, or whether they are carried off mechanically. The mercury was mixed with lead, bismuth, tin, sodium and copper, and then distilled, first from porcelain, afterwards from glass retorts. As long as the metal is very impure, the glass retorts are destroyed, hence the necessity of distilling first in porcelain. After twelve distillations, the retorts contained no residue, and the mercury was perfectly pure, as was proved by dissolving about two grammes in nitric acid, evaporating in a weighed platinum capsule and igniting; the weight of the capsule was unchanged.

To restore the original white colour of silver filigree jewellery when tarnished by wear or shop-worn, first wash the articles in a solution of one fluid ounce of liquid potassa in twenty of water, rinse, and then immerse in a mixture of salt one part, alum one part, saltpetre two parts, dissolved in four parts water. Let them remain for five minutes. Wash in cold water, and dry with chamois leather.

THE best lacquer for articles of brass, such as mountings for optical instruments, &c., depends somewhat on the colour of the brass. For a light brass a dark lacquer is required, and *vice versa*. The following are some receipts given by an American exchange:—1. Seed-lac, dragon's blood, annatto and gamboge, each 4 ozs.; saffron 1 oz., spirits of wine 10 pints. 2. Turmeric 1 lb., annatto 2 ozs., shellac and gum juniper each 12 ozs. 3. Gamboge ½ oz., aloes 1¼ oz., shellac 8 ozs., spirits of wine 1 gallon. See that the finished articles are clean, heat them as hot as the hand will bear, and distribute the lacquer quickly with a brush or rag at one operation over the surface. When the articles are very small, they require to be heated in an oven to harden the lacquer. Several coatings of a thin lacquer give the best results.

CYANIDE SORES.—According to Mr. Alexander Watt, these painful sores may arise from two principal causes: first, from dipping the hands or arms into cyanide baths to recover articles which have dropped into them—a very common practice, and much to be condemned; and second, from the accidental contact of the fingers or other parts of the hand, on which a recent cut or scratch has been inflicted, with cyanide solutions. In the former case, independent of the constitutional mischief which may arise from the absorption by the skin of the cyanide salts, the caustic liquid acts very freely upon the delicate tissue of the skin, but more especially upon the parts under the finger-nails. Instances have been known in which purulent matter has formed under the nails of both hands from the cause, necessitating the use of the lancet and poulticing. Again, when cyanide solutions come in contact with recent wounds—even very slight cuts or abrasions of the skin—a troublesome and exceedingly painful sore is sure to result, unless the part be at once soaked in warm water; indeed, it is a very good plan, after rinsing the part in cold water, to give it a momentary dip in a weak acid pickle, then soak it for a few moments in warm water, and after wiping the part dry with a clean rag or towel, apply a drop of olive oil and cover up with a strip of thin sheet guttapercha.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

7,512. G. Pritchard, Birmingham, for "Improvements in solitaires, collar and shirt studs, cuff links and other like dress fasteners and ornaments." (Complete specification.) Dated May 25, 1887.

7,559. W. P. Greaves, Birmingham, for "An improved collar stud attachment device." Dated May 25, 1887.

7,686. E. Morin, a communication from T. Walther, Germany, for "Improvements in bracelets and other articles of jewellery." Dated May 27, 1887.

7,797. G. E. Walton, Birmingham, for "Improvements in fastenings for solitaires, sleeve links, studs, scarf rings and other similar articles." Dated May 28, 1887.

7,834. H. Edmunds, London, for "Improved means for controlling, transforming, regulating, synchronising and registering electric currents." Dated May 28, 1887.

7,891. George Edwin Hart, London, for "Improvements in Watches." (Complete specification.) Dated May 31, 1887.

7,909. W. G. Harris, Birmingham, for "Improvements in adjustable watch keys, entitled 'The Simplex Adjustable Watch Key.'" Dated June 1, 1887.

8,210. N. Federgreen, London, for "Improvements of precious stones and jewellery." Dated June 8, 1887.

8,245. R. H. Jones and T. Lee, Birmingham, for "Improvements in bracelets." Dated June 8, 1887.

8,334. J. Nicholls, Sheffield, for "Improvements in 'silver cleaning' paste." Dated June 10, 1887.

8,427. J. B. Thompson and W. White, London, for "Improvements in the manufacture of aluminum and its alloys, and apparatus for the purpose." Dated June 11, 1887.

8,589. F. R. Baker, Birmingham, for "Improvements in watch keys," Dated June 15, 1887.

8,614. J. L. Garsed, Halifax, for "Improvements in timekeepers and time indicators." Dated June 15, 1887.

8,750. T. White, London, for "Improvements in the application of the electric light to watch stands, clocks, ships' compasses, and for like purposes." Dated June 17, 1887.

8,754. A. J. Ready, London, for "A new or improved mode and means for indicating time, and for other purposes." Dated June 17, 1887.

8,764. S. Smirke, London, for "An improved stud, chiefly designed for use with shirts, collars and similar articles." Dated June 17, 1887.

8,788. A. Lovekin, Birmingham, for "An improved spring clip for attaching coins, medals or stones to brooches and other articles of jewellery." Dated June 18, 1887.

8,872. J. F. Clasen, London, for "Improvements in safety screw fastenings for studs, solitaires and other purposes." (Complete specification.) Dated June 20, 1887.

## Recent American Patents.

| | | |
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| Aluminum and Aluminum Bronze, Production of. | R. Gratzel | 362,441 |
| Bracelet. A. Williams ... ... ... ... ... ... ... | | 363,309 |
| Button, Sleeve. E. J. Coombs ... ... ... ... ... | | 362,426 |
| Button, Sleeve. F. W. Richards ... ... ... ... ... | | 362,315 |
| Castings, Making Metal. J. Walker ... ... ... ... | | 362,337 |
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A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, Imperial Buildings, Ludgate Circus, E.C.

## Gazette.

### PARTNERSHIPS DISSOLVED.

W. & E. Mimpriss, Davies Street, Berkeley Square, jewellers. Paulson & Co., Nottingham, pawnbrokers, so far as regards F. Paulson. J. Sewill and M. R. Sewill (trading as J. Sewill), Cornhill, chronometer makers. Green & Fuidge, Stratford-on-Avon, actinometer manufacturers. John Wragg & Son, Sheffield, cutlery manufacturers. Bailey Brothers, Market Terrace, Wood Green, and elsewhere, watchmakers. Sturla & Monday, Liverpool, pawnbrokers.

### THE BANKRUPTCY ACT, 1883.

#### RECEIVING ORDERS.

*To surrender in London.*—William Van Walwyk, Clerkenwell Road, diamond merchant. F. Hummell, Montpelier Street, Knightsbridge, watchmaker. Emperious Turnor, Broadway, Hammersmith, jeweller.

*To surrender in the Country.*—Joseph Joseph and Maurice Joseph (trading as J. Joseph & Sons, and as Scott & Co.), Birmingham and elsewhere, jewellers and export merchants. Henry Simon Ansell, Birmingham, jewellers' case maker. Rosina Ash, Birmingham, pawnbroker. George Whitehouse (trading as G. Whitehouse & Co.), Birmingham, electro-plate manufacturer. James Sutton (trading as J. P. Cutts, Sutton & Sons), Sheffield, optician. James Henry Smith, Birmingham, ornamenter in gold.

#### AMENDED NOTICE.

Edward Welbourne, Ilkley, Yorkshire, jeweller.

PUBLIC EXAMINATIONS.

*In London.*—W. Van Walwyk, Clerkenwell Road, diamond mounter; July 12, at 12.30.

*In the Country.*—G. Whitehouse (trading as G. Whitehouse & Co.), Birmingham, electro-plate manufacturer; July 7, at 2.

ADJUDICATIONS.

*In London.*—S. Lazarus, Hatton Garden, optician. F. Hummell, Montpelier Street, Knightsbridge, watchmaker. E. Turnor, The Broadway, Hammersmith, jeweller.

*In the Country.*—R. H. Cheetham, Southampton, cutler. H. S. Ansell, Birmingham, jewellers' case maker. M. Baum, Coventry, watch manufacturer. G. Whitehouse (trading as G. Whitehouse & Co.), Birmingham, electro-plate manufacturer. J. Sutton (trading as J. P. Cutts, Sutton & Sons), Sheffield, optician. J. H. Smith, Birmingham, ornamenter in gold.

NOTICES OF DIVIDENDS.

*In the Country.*—J. F. Bayfield (trading as J. F. Bayfield & Son), Lowestoft, watchmaker; 1s. 10¾d., first and final; July 1, 77, Colmore Row, Birmingham. J. H. Wood, Northampton, watchmaker; 3s. 6d., first and final; June 27, 6, St. Paul's Square, Bedford. W. S. Jones, Bolton, watchmaker; 3s. 6¾d., first and final; June 29, Official Receiver, Bolton. H. A. Dightam, Armley, Yorkshire, jeweller; 7½d., first and final; June 25, Official Receiver, Leeds. T. A. Hockaday, Rochester, watchmaker; 1s. 2¼d., first and final; July 6, 5, Hatton Garden, E.C.

SCOTCH SEQUESTRATIONS.

J. O'Mahoney, Dundee, pawnbroker. W. Lumsden (deceased), Alford, watchmaker.

## London Bankruptcy Court.

*In re* LUND & BLOCKLEY.

ON the 9th ult. this case came before Mr. Registrar Hazlitt, at the above Court. The debtors, Messrs. George Lund and Frederick M. Blockley, carrying on business as watch and chronometer makers in Pall Mall, and also at Bombay, petitioned the Court on February 28 last. Their liabilities were returned in the statement of affairs at £15,319, with assets estimated to produce £8,511. The case was now brought before the Registrar on an application to confirm a scheme by which the debtor Blockley agreed to pay all preferential debts in full, and a composition of 5s. in the pound to the unsecured creditors by instalments extending over a period of twelve months, in exchange for the assets of the business in England.—Mr. Aldridge appeared for the Official Receiver, and Mr. F. C. Willis for the debtors.—It would appear that Messrs. Lund & Blockley commenced business in 1869, each partner introducing £1,000 as capital, and they attributed their failure to losses on the trading, excess of expenditure over profits consequent upon competition by co-operative stores, and to general depression in trade. The Official Receiver reported that, having regard to the nature and actual value of the assets in England, the proposed scheme did not appear unreasonable. For the debtors' interest in the Bombay business an offer of £2,000 had been made, which would suffice to pay a further composition of 3s. in the pound. It was stated that by the failure of Messrs. Grant & Peake the firm incurred a loss of £1,700. No creditor appeared to oppose, and the Registrar made an order confirming the scheme.

*In re* WALTER GEORGE.

ON the 10th ult., before Mr. Registrar Brougham, this bankrupt, who was a wholesale jeweller, carrying on business in King Square, Clerkenwell, applied to pass his examination. His liabilities were returned in the statement of affairs at £7,668, of which £5,949 will probably rank, with assets £1,750.—Mr. Aldridge appeared for the Official Receiver, Mr. Norman for the trustees, and Mr. Hermann Myer for the debtor.—The debtor commenced business about twenty years since, with borrowed capital, in partnership with his brother, as W. & S. George. In April, 1883, they filed a liquidation petition, under which a composition of 7s. 6d. in the pound was accepted by the joint creditors. S. George retired in January, 1884, and the bankrupt attributed his present failure to financial difficulties, originating from the payment of too large a composition under the former proceedings, and to falling off in his trade, owing to want of capital, depression and other causes. He stated in the course of his examination that he was not aware of his insolvent position until the present year. His Honour allowed the debtor to pass his examination.

## Meetings of Societies, &c., for the Month.

| SOCIETIES. | JULY. |
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| Geologists' Association, University College ... ... | 1 |
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The Annual Dinner of the Horological Club will take place on Saturday, the 9th inst., at the Cock Hotel, Epping. Tickets can be obtained on application, from the Hon. Secretary, Mr. Henry Bickley, 33, Half-Moon Crescent, N., before July 6.

## Correspondence.

*All Letters for Publication to be addressed to the* EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *Imperial Buildings, Ludgate Circus, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

[PRIZES FOR ART WORKMANSHIP.]

DEAR SIR,—The Council of the Society of Arts will be much obliged if you can assist them in bringing the enclosed particulars of a competition for Art Workmanship under the notice of any persons interested in the subject.

Yours faithfully,

H. TRUEMAN WOOD, *Secretary.*

[The particulars of the competition referred to were published in full in our last issue. In compliance with the above request we beg to direct our readers' attention to them.—ED.]

[KEW CERTIFICATES.]

SIR,—I think the questions raised by your correspondent, Mr. Arnold, as to the relative merits of Swiss and English watches, and the value of Kew certificates, deserve consideration by those interested in English watchmaking. Mr. Arnold asks in his last letter, as the point of his question, "Do the Swiss watches give better results in the pocket than English ones?" But his question which follows seems to me to be the one he is most desirous of obtaining information upon; that is, "Are the Kew trials a measure of the probable performance of the watch in use?" Mr. Arnold seems a little confused, as, although he has evidently made up his mind as to the proper answers to his questions, he quotes the results of the late Melbourne Exhibition and the opinions of Mr. Whipple against his own convictions. The Melbourne Exhibition proves nothing: in the first place the Swiss watchmakers formed a syndicate and exhibited under one head, and the first prize was awarded to the best of all the Swiss watches exhibited, while the second best was a Clerkenwell-made watch which gained 95 out of a possible 100 marks—the maker of this watch being unaware of the fact that it was to be exhibited, and other English exhibitors at that Exhibition were not informed and were in ignorance of the manner in which the watches were to be tested; and it was notorious that the jury who awarded the prizes at that Exhibition gave the greatest dissatisfaction to the English exhibitors. Mr. Whipple's opinion is based entirely on the results of the Kew trials which are published, and therefore no special importance can be attached to it.

Although your remark in the May number of the journal, "That none but a good watch can fulfil the requisite conditions for obtaining an A certificate" is quite true, still I think I can show that a watch that would not fulfil these conditions would go better in ordinary wear for a *long period* than one that may have obtained an A certificate; and I am not relying on theory alone, as I have more than one example of watches, which, having obtained that coveted prize, have gone very badly afterwards.

It is shown by the Kew rates, and is well known to watch springers, that there is little difficulty in getting good results in the temperature trials, and that timing in positions is the real trouble. It is not difficult to get equal time in the hanging and lying positions, but the quarters or one of them will generally be out. Now if the balance has a sufficiently great arc of vibration to overcome the change in the condition of the oil, dirt or other obstructions for a long period, it would be useless to attempt to manipulate the balance screws with the object of rectifying the difference in time in the quarter positions, as, if the balance vibrates more than a full turn, putting it out of poise would not have the desired effect. Therefore, the balance arc must be reduced to one turn by the application of a suitable mainspring, and then any very little additional weight to one side of the balance, by drawing out the quarter screw, will cause the watch to gain when that side is downwards and will by this means equalise the time in positions; and if all the other conditions are satisfactory, the watch will have an excellent rate while the oil is fresh and the watch clean during the interval of the Kew test, but at the end of a few months every change that shortens the arc of vibration of the balance intensifies the evil of putting the balance out of weight, and a short arc of vibration (an evil in itself) soon results in bad timekeeping if the balance is out of poise.

If this watch had only been made with a view to giving a wearer satisfaction, instead of being prepared for a Kew trial, the balance arc would (or should) have been sufficiently large to enable it to disregard a slight change in the oil; and as the balance would have been perfectly in poise, a slight alteration in the arc would not affect the time in positions; and, therefore, this watch, which might not have obtained an A certificate, would certainly be superior to the one timed on the lines I have described. I do not say that all watches sent to Kew are prepared in this way, but I know many of them are; and many timers defend the practice by saying it was the common way of adjusting, or rather timing, pocket chronometers. But the comparison is not relevant: pocket chronometers rarely had a vibration of over a full turn of the balance, as it is not safe to give them a larger arc of vibration without some provision to prevent their *tripping*; and as the chronometer impulse requires no oil, the rate does not vary as does that of a watch with a lever escapement, which will not go without oil. If the Kew trials were to extend over six months, the results would be different and of more use to the public.

As to the good these trials have done watchmakers, I believe there are few of us who have not been disappointed. An independent trial seemed at first to be nothing but a gain to men who had been labouring all their lives to make the name and fame of others, as it was thought that it would be a means of bringing the makers of high-class watches before the public and the buyers of watches who hitherto had no means of doing so themselves; but when it was announced that the Kew authorities were ready to give a duplicate copy of a certificate, and to alter the name of any depositor or maker of the watch to that of enterprising tradesmen who call themselves watchmakers for the trifling cost of one shilling, it became a discouragement to good men, as it only helps the quack and ceases to be an honourable distinction to be sought after or prized.

Yours, &c.,

"A LONDON WATCH MANUFACTURER."

*June* 24, 1887.

## Answers to Correspondents.

W. MORRIS.—*Plate Licences.*—The licence would be unnecessary in your case. The clause (33 & 34 Vict., cap. 32) reads: "On and after the sixth day of July, one thousand eight hundred and seventy, it shall not be necessary for any person to take out a licence as a dealer in plate, in order to enable him to sell watch cases which shall have been made by him."

**In the High Court of Justice,**
CHANCERY DIVISION.

BETWEEN DRUIFF & DRUIFF . . *Plaintiffs*
(Trading as WILLIAM HERBERT & GODFREY)
AND JOHN TAYLOR. . . . *Defendant*

In consideration of your withdrawing the proceedings you have instituted against me for infringing your Trade Mark for Spectacles, registered as William Herbert & Godfrey's "Aqua Crystal," by advertising myself as a maker thereof, I hereby apologise to you for so doing, and undertake to discontinue all use of such words and empower you to advertise this apology once in four newspapers.

*Witness*,
GEORGE T. SMITH, *Solicitor*,
BIRMINGHAM.

JNO. TAYLOR,
*May* 28, 1887.

To Messrs. DRUIFF & DRUIFF.

R. FREDERICK HILL & Co.,
24, Chancery Lane, W.C.
*Plaintiffs' Solicitors.*

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

VOL. XIII.—NO. 2.] AUGUST 1, 1887. [Subscription, 5s. per Annum. { Post Free.

CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to
THE WATCHMAKER, JEWELLER & SILVERSMITH,
IMPERIAL BUILDINGS, LUDGATE CIRCUS, LONDON. E.C.

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

WITH the finish of the Jubilee preparations manufacturers might naturally have expected a return to what has been, unfortunately, of late years, the ordinary jog-trot output: but that such a complete stagnation of trade should have come about as at present exists was certainly never anticipated by the most confirmed pessimists.

We have lately had to bewail the condition of the English watch trade, but from all accounts the jewellery and plating industries are in even a worse plight. Never since what may be termed its *renaissance* (which is said on good authority to date from the Great Exhibition of 1851) has the former trade been in such a depressed state. Reports from Birmingham show a condition of things amounting to almost a panic; while from other manufacturing centres the state of business, if not equally bad, is sufficiently serious to afford matter for anxious contemplation.

Without going any length with the uncomfortable alarmists, the constant iteration of whose chronic grumblings has begotten the inevitable resultant of familiarity, it would be wilfully foolish to disregard the present aspect of affairs. It is estimated that the failures during the past twelve months represent an aggregate loss of upwards of £300,000 to the Birmingham manufacturers alone, and doubtless statements from other quarters would show proportional amounts.

Although the universal business depression is unquestionably the prime cause of the slackness in the jewellery trades, which are a kind of reflex index to the general prosperity of the country, it is not in itself sufficient to account for the altogether abnormal condition of those industries, and other elements are, therefore, to be looked for by those interested in their amelioration. As in other trades during periods of depression difficult to account for, numberless suggestions have been made of means for infusing a healthier tone into business, and one of the best recently thrown out seems to us to be embodied in the letter of Mr. S. Wall Richards, published in another column.

No doubt Mr. Richards has hit the mark when he says jewellers take no measures to educate and stimulate public taste

through the medium of suitable organs of the press, as is done in almost every other business wherein changes of fashion are desirable.

But, after all, the distributers should deal with the public; and we go a step farther than Mr. Richards and say that, other considerations apart, in order that the retailers shall be able to do so successfully, it is necessary that they be brought into closer relations with the manufacturers by the elimination of the factor element. This result is certain to be brought about, sooner or later, by the increasing keenness of foreign competition, which will not allow of the third profit of a middleman between the producer and the distributer.

We are glad to see that the obvious advantages which would accrue to the trade by getting rid of an unnecessary anomaly, that has hitherto hindered business and absorbed so large a share of the results, is at last wisely being recognised on all sides.

## General Notes.

THE Merchandise Marks Bill passed through Committee of the House of Commons on the 8th ult., after having been considered by a Select Committee. The Bill was read a third time in the House of Commons on the 12th, and afterwards was read a first time in the House of Lords.

The story is going the rounds of the society journals that a young lady visited a West End jeweller and told him that her father was going to buy her a pair of diamond earrings, and that she would like to look at some. The jeweller, knowing her father by reputation, spread out a number of costly gems before her. She looked them over critically and, having selected the most handsome pair, asked if she might take them home and examine them more at her leisure. The permission was promptly accorded, and the next day the young lady brought back the earrings and said that she was not quite satisfied with them, and she thought that after all it might be some time before her father would indulge her taste for diamonds. "That's a great pity," replied the jeweller; "I was at —— reception last night, and I thought them very becoming to you."

The German papers continue to publish numerous anecdotes of the late Herr Krupp. The Vienna *Extrablatt* gives the following interesting incident which marked the visit of the Emperor William to the Essen Works. The Emperor displayed great interest in the working of the steam hammer, and Herr Krupp took the opportunity of speaking in high praise of the workman who had special charge of it. "Ackermann has a sure eye," he said, "and can stop the falling hammer at any moment. A hand might be placed on the anvil without fear, and he would stop the hammer within a hair's breadth of it." "Let us try it," said the Emperor, "but not with a human hand—try my watch," and he laid it, a splendid specimen of work richly set with brilliants, on the anvil. Down came the immense mass of steel, and Ackermann, with his hand on the lever, stopped it just the sixth of an inch from the watch. When he went to hand it back the Emperor said kindly, "No, Ackermann, keep the watch in memory of an interesting moment." The workman, embarrassed, stood with outstretched hand, not knowing what to do. Krupp came forward and took the watch, saying, "I'll keep it for you if you are afraid to take it from His Majesty." A few minutes later they again passed the spot, and Krupp said, "Now you can take the Emperor's present from my hand," and handed Ackermann the watch, wrapped up in a thousand mark note.

The first stone of the Imperial Institute was laid by Her Majesty the Queen on the 4th ult.

The Technical Education Bill.—Writing to a contemporary, Mr. Edward J. Watherston says:—Every effort should be made to get the Government to reduce the standard to which it is proposed to limit facilities for technical handicraft instruction. Standard VI. is absurdly too high. It would limit the number of children to 128,151 (roughly, 80,000 boys and 50,000 girls), scattered throughout 19,173 elementary schools. In many schools, in districts where the necessity for manual instruction is most apparent, there are but few, if any, sixth and seventh standard scholars, and those that are are being technically trained already as pupil teachers or for walks of life other than mechanical. Standard IV. is quite high enough, opening the door of handicraft instruction to 848,041 children. I would go lower, to Standard III., permitting 1,400,000 children to have such instruction as may be possible, commencing at ten years of age, as in Continental schools. However, do not let us be contented with any higher standard than the fourth. In point of fact, it should be left to the discretion of the school managers. It will be most unwise to tie their hands by an Act of Parliament. Depend upon it, nothing will do more to get regularity of attendance than manual workshop half-time schools—literary work in the morning, workshop in the afternoon; only children who have been at the morning school to be allowed to go to the afternoon workshop school.

The American testimonial to Mr. Gladstone, a description of which was given in our last month's issue, was presented to the right hon. gentleman on Saturday, July 9, at Aberdeen House, Dollis Hill, Willesden.

The Manufacture of Artificial Rubies.—In a paper recently read by M. Frémy before the French Academy of Sciences, the author, in describing the successful researches made by him, with the assistance of M. Verneuil, for obtaining artificial rubies, stated that he discovered the first method of producing rubies some years ago, but that all the specimens obtained were pasty, and wore away in scales. He adopted another process, and by letting alumina dissolve in fluoride of calcium, he obtained crystals of alumina—that is to say, perfect rubies, which defied the closest scrutiny, of even higher value than natural stones. By the latter process, according to M. Frémy, stones of almost any size can be produced.

The Proposed International Exhibition in Glasgow.—The guarantee fund for the proposed International Exhibition, to be held in Glasgow during the summer of next year, already exceeds £240,000, and is being increased. The objects of the Exhibition, as stated in the prospectus, are "to promote and foster industry, science and art, by inciting the inventive genius of our people to still further development in arts and manufactures; and to stimulate commercial enterprise by inviting all nations to exhibit their products, both in the raw and finished state." Examples of the manufactures of Glasgow and the surrounding districts—chemical, iron and other mineral products, engineering, shipbuilding, electrical and scientific appliances, and textile fabrics—will be shown; and similar and more varied exhibits may be expected from other parts of Great Britain and from the Continent. Promises of support have also been received from America, India, the Canadian, Australian, Cape and other Colonies. The site, which has been granted by the Glasgow Corporation, extends to 60 acres, and the buildings will cover about 10 acres.

A New Unit for Absolute Time.—Mr. Lippman (*Comptes Rendus*, 104, 1,070) proposes a unit of absolutely invariable time, which, as independent of every astronomical hypothesis, would serve as a check on the universally adopted unit, the second. The proposed unit of time is the specific resistance of mercury in absolute electro-static units. The constancy of this resistance, the fact that it is indifferent what units of length and mass are used, and the high degree of accuracy that the available experimental methods for its determination promise, are cited in its favour in detail.

Brussels International Exhibition.—A complete programme of the "Grand Concours International des Sciences et de l'Industrie," in connection with the Exhibition, to be held at Brussels in 1888, has been prepared by M. Leon Somzée. It contains a series of questions proposed in connection with the different divisions of the Exhibition. The classification consists of 50 "Concours," commencing with professional and industrial instruction, and ending with the ornamentation of the galleries. A communication has been received from the Foreign Office, through the Science and Art Department, containing a copy of the circular letter addressed by the Prince de Chimaz to the Belgian Consuls, in which he asks for their assistance. The Comte Adrien d'Oultremont, member of the Belgian Chamber of Representatives, has been appointed Commissioner-General of the Government at the "Grand Concours." The *Moniteur Belge* of the 3rd ult. contains a royal decree nominating Vice-Presidents, Secretary-General and Secretaries.

The Melbourne Exhibition.—We learn on going to press that the date of receiving applications for space at the Centennial International Exhibition, to be held at Melbourne next year, has been extended to October 31 next.

Hobbs, Hart & Co.—The prospectus has just been issued of Hobbs, Hart & Co., Limited, the capital of which is £100,000, with debenture stock for £20,000. The company has been formed for the purpose of taking over as a going concern, and working and extending the business of Hobbs, Hart & Co., manufacturers of locks, safes and strong-rooms. The firm commenced operations in 1851, and now their locks are in use in first-class hotels in London, Government departments, museums, hospitals, workhouses, prisons and asylums, while their carriage-door locks and handles are used on the principal railways. Safes and strong-rooms have been constructed by the firm for Her Majesty's gold and silver plate and jewels, and for a number of banks, including the Bank of England. According to the prospectus, medals were awarded at the International Exhibitions, London, 1851 and 1862; and Paris, 1855 and 1867; the grand medal for progress, at Vienna, 1873; gold medals, Paris Exhibition,1875, and Melbourne, 1881; and Edinburgh International, 1886. The reason assigned for the conversion of the business into a joint-stock enterprise is the recent death of Mr. Hart, the sole proprietor. An investigation of the books of the firm has been made by a well-known firm of chartered accountants, and the directors are of opinion that the result fully justifies them in placing the business before the public as a sound investment. The capital is divided into 30,000 preference shares of £1 each, bearing 6 per cent., and 70,000 ordinary shares of £1 each.

Aluminum Co., Limited.—This company has been formed to acquire the patents and work and develop the inventions of Mr. James Webster for the manufacture of pure alumina and certain metallic alloys and compounds, together with the business now carried on by Webster's Patent Aluminum Crown Metal Co., Limited, in Birmingham, Sheffield and London; and also to acquire the patents and work the invention of Mr. H. Y. Castner, for the manufacture of sodium and potassium. The processes are stated to have been made the subject of exhaustive examination by Sir H. E. Roscoe, M.P., F.R.S., Mr. George Gore, LL.D., F.R.S., and Mr. James Mactear, F.C.S., F.I.C. The first-named gentleman will join the board after allotment. The share capital is £400,000 in £5 shares, and the debenture capital £100,000. These debentures will bear interest at 6 per cent. per annum. Applications are invited for the debentures and 53,334 A shares.

Professor Tyndall was entertained at dinner on June 29, on his retirement from the Chair of Natural Philosophy at the Royal Institution, and, in replying to the toast of his health, he alluded to the advance made with scientific education, remarking that schools, colleges and universities were now rising in our midst which promised to rival those of Germany.

Marie Antoinette's favourite pearl necklace, consisting of sixteen rows of pearls, formerly belonging to the Crown Jewels of France, is now to be seen in the shop of Berlin's chief jewellers, Herren Friedberg und Soehne.

Messrs. Uibel & Barber, of 57*b*, Hatton Garden, London, E.C., are manufacturing a new and beautiful line of goods—of sea beans and alligator teeth. They work them up into bangles, brooches, scarf pins, charms, &c., the workmanship on which is perfect; and as they employ steam power in their factory they reach the highest perfection in the polishing of the sea beans and alligator teeth. The sea beans, which are of varied and beautiful colours, are gathered on the coast of Florida, where they wash ashore from the Coral Islands on which they grow. Being of an exceedingly hard nature, they are susceptible of an extremely high polish. The alligator teeth are from alligators hunted in the bayous of Texas and everglades of Florida, where they are sought for their teeth and hides.

The Diamond Market.—The *Amsterdam* market has been comparatively quiet throughout the month; prices for finished goods remain low, and only the smaller stones go off. There is, however, a hopeful tone pervading; manufactories are fully going, and a change for the better is expected to take place in prices shortly. Few foreign buyers are in town.

The *Paris* merchants are in the midst of their holiday season, and very little local business is being done, but a few unimportant transactions are being effected with strangers who are visiting the city.

The steamers "Drummond Castle," "Prætoria," "Pembroke Castle," "Moor" and "Garth Castle" arrived at Plymouth during the month, bringing large consignments of current goods from the fields. But, although considerable business was done, the high quotations ruling restrained speculation, the buyers saying that, as finished goods are so difficult to sell this season, they have to exercise unusual caution. A good many parcels are on hand, and, as the market is well stocked, a fall in prices may be expected shortly.

Latest from *Kimberley* report more buoyancy; prices better for yellow; all goods very firm, with a tendency to advance.

Silver.—The market has been comparatively unchanged throughout the month, which has been marked by unusual quietness. When the Mint orders were completed a fall in prices was expected, but this did not seem to make much difference, and the order by the Chinese Government for coinage presses, which we noticed in our June issue, has left the market equally undisturbed.

Some of the latest arrivals from *Chili* were disposed of at 44½d. per oz. Mexican dollars are quoted at 43⅛d.

The Technical Education Bill.—In the House of Commons on Tuesday, July 19, Sir W. Hart-Dyke, in moving leave to bring in a Bill to facilitate the provision of technical education, justified the introduction of a new question so late in the session by the fact that the subject had for a long time excited considerable interest among the artisan class. Other nations had secured to themselves the advantage of special industrial training for their youth, and had, in consequence, outstripped us in some branches of industry. This Bill would enable the local authorities to make provision for the establishment of technical schools, or for assisting in the establishment of technical schools, and it would give them power to supplement existing teaching in elementary schools by technical instruction. The ratepayers would be consulted before the Bill came into operation, and would have a power of veto, and it was proposed that it should be administered by the Science and Art Department. The rating authority would be the School Boards, where they existed, and in other places the Town Councils. He believed the measure would be essentially popular among the working classes, and that it would do an enormous amount of good.—Mr. Mundella deprecated discussion till the Bill was in the possession of members, but promised assistance in its progress.—Leave was given to bring in the Bill.

# Birmingham News.

From Our Correspondent.

THE watch trade still remains in a very depressed condition, both here and at Coventry: and there are a number of Coventry watch case makers seeking employment in Birmingham, but the makers here are already overhanded.

* * *

One of the foremen of the English Watch Co., Villa Street (Mr. Lown), committed suicide last week by jumping from a railway bridge in front of a passing train. The cause is said to be a notice of reduction in wages of the employés of the firm, and this so affected the deceased as to cause this sad result. He leaves a widow and one child.

* * *

When the leading evening paper (*The Birmingham Daily Mail*) has two articles in one week upon the deplorable state of the jewellery trade, and calls attention to the rotten system of trading now pursued, it certainly means a black outlook. But it was as certainly a great mistake on the part of the writer—if he wished to assist the trade—to attempt to do so by those means. My advice is, do not advertise to the public that jewellery is out of fashion, by writing leaders such as those referred to: do not complain to the public that the trade is conducted upon a "rotten system." The public cannot alter this: in fact, the public in general do not care a rap about it. Why should they? It only makes the trade a laughing-stock for other business men, who conduct their affairs upon more rational principles. Let the manufacturers combine and place a limit upon the approbation system and long credit. Take Wall Richards' advice and show the public that jewellery must be worn at certain times and places. Do not tell them not to wear it, as has been done in the *Daily Mail*. Was ever anything seen that was more shortsighted than those articles?

* * *

As to the abuse of the "appro." system, here is an instance in the affairs of Schuler, Warstone Lane, Birmingham. At the time of calling his creditors together he held a number of goods on "appro.," returns from which should have been made in order to enable the owners to charge in sales to the estate, and thus prove their debt. But in this instance the debtor refuses to return parcels in the usual way, but sends to each creditor a statement of his sales to be charged to the account. If any creditor accepts this arrangement the trade will have him to thank for a new opening for risk and loss which might be avoided by a little common sense, which, to be candid, appears to be a very scarce commodity in bankruptcy cases among the jewellers.

* * *

The new transparent lacquers introduced here from America are being used by several Birmingham firms, and they find them a great preventive against oxidisation, and as it is colourless it is suitable for gold and silver as well as commoner metals. A manufacturer here showed me some silver articles to which it had been applied that were perfectly white and good as new after hanging in the fumes of their pickling vat for some three months—a tolerably severe test. I think it has a promising future, the only drawback being the cost, which is £1 per gallon.

* * *

A novel and useful article, just got out by a Birmingham firm, is a cyclist's companion in the shape of a watch case, with a place in front for the club ticket and a set of dials to record the distance made, backed by a purse to contain the necessary cash for touring purposes: it will be in the market shortly. The dials may also be used as a whist marker.

* * *

Medallists still report a fair amount of business, but the general trade is still far from active. Out-workers, such as engravers, enamellers, setters, &c., are working very short hours.

* * *

The gilding and plating branch is quite overdone here, several new works having opened lately, and the competition is most keen.

# British Horological Institute.

THE annual meeting of the members of the British Horological Institute (in union with the City and Guilds Institute) was held on Tuesday, 19th ult., at the offices, Northampton Square, Clerkenwell; Mr. D. Glasgow presided. The report submitted by the Council for the half-year ended June 30 last stated that though, taken as a whole, the balance sheet for the first half of the year might be said to be satisfactory, it was a matter of grave concern that even the modest sum received on account of the annual subscriptions of members and associates in the corresponding period of last year had not been maintained. It must, of course, be expected that this item would continue to be in some measure a reflex of the general prosperity or otherwise of the horological trades; still the Council ventured to believe that any considerable shrinkage in the amount might be avoided, even in times of depression, if the members who believed in the work of the Institute, and had its welfare at heart, would bring its claims before the notice of their friends.

The progress of the educational work was set forth in various reports, and, as the Council anticipated, a considerably improved tone had resulted from the introduction of the new rules for the conduct of the classes. The Class Visiting Committee, in a report to the Council, testified to the continued efficiency and excellence of the educational work. They said that on the whole the Council of the Institute might congratulate themselves on the work of the year, and feel that their efforts had added to the sum of the skill of horological interests. The theoretical work had, concurrently with the practical, been carried on with considerable energy. The Class Visiting Committee, in concluding their report, observed that, while being in full sympathy with the principle of teaching the student to rely on his own ability, rather than be dependent on the excellence of tools of precision not always accessible, they thought that the teaching would be profitably augmented by instruction in the use of some of the advanced lathes now produced for watchmakers, to those students who had already acquired manipulative skill. This Committee also suggested that it would be desirable if the Council would provide a transit instrument, the use of which might be taught as a portion of the instruction to all students advanced sufficiently to profit by it.

The report of the Council proceeded to state that a Select Committee of the House of Commons had been engaged in taking the evidence of watchmaking experts in reference to the Merchandise Marks Amendment Bill of the Government, but beyond sending to the Chairman of the Committee the previously formed opinion of the Council, to the effect that no remedy for the prevention of the sale of foreign watches as English would be efficacious unless the Hall-marks of the British assay offices were confined to such cases as were of British make, the Council has taken no part in the matter, in deference to a section of the trade who desired to place certain restrictions on manufacturers. Fourteen members and two associates had been elected during the half-year. There were at present on the books 452 members and fifteen associates.

The Chairman moved the adoption of the report, remarking that he thought that more support should be given to the Institution by the members. He held that it was not the business of this Institute to provide machine tools to teach the young men in their classes, though expressing the opinion that this country would be able to go as far as it was profitable to go in the use of machine tools.

The motion was seconded by Mr. H. Ganney, who thought that the pupils should learn something about the use of machine tools.

Mr. Corke suggested the establishment of a factory where watches could be made on a large and cheap scale to meet foreign competition.

The report was adopted after a discussion, and the meeting proceeded to formal business.

The following officers were elected:—President, The Rt. Hon. Lord Grimthorpe; Vice-Presidents, Daniel Buckney, David Glasgow, Julien Tripplin, F.R.A.S.; Treasurer, Thomas Mercer;

Members of Council, Richard Atkins, Charles Bacon, William Barnsdale, Thomas Baxter, James Bray, Richard Bridgman, Daniel Buckney, Lewis Donne, Charles Dunn, Robert Gardner, John Hammersley, G. H. Harwood, James Haswell, Thomas Hewitt, H. P. Isaac, Ami Jaccard, E. D. Johnson, F.R.A.S., Victor Kullberg, James Oliver, Edward Perrett, Edward Rigg, M.A., J. B. Smith, Richard Strachan, F.R.M.S., Julien Tripplin, F.R.A.S., F. W. Troup, Joseph Usher, F. R. Warman, A. W. Webb, T. J. Willis, Philip Woodman.

## Mr. Cave Thomas on Applied Art.

THE terms "Applied Art" and "Applied Arts" may possibly be sufficiently understood by painters, sculptors and architects, but the classification adopted by the late Sir Henry Cole, the "Fine Art Manufactures," would be better understood by the many; moreover, "Applied Art" is not a sectional, but a general term. All fine art is applied art, art applied to painting, to sculpture, to architecture, to mural decoration, &c. We should recollect, too, that the word "art" is applicable to the mechanical as well as to the fine arts, and the question naturally arises whether there be any great generalisation that formulates the aim of all art, that of the fine arts as well as that of the mechanical? There is—and it may be thus concisely expressed—adaptation to purpose, that adaptation to purpose which, in its complete fulfilment, constitutes perfect fitness. The exaltation of the beautiful, to the disparagement of of the fit, is the demoralising art tendency of modern æstheticism. The good old English practice of aiming at perfect fitness would have led the fine arts, and the art manufacturers, into the right path. The Greeks recognised the principle of adaptation to purposes as the true art-motive, hence the chaste simplicity that characterises all their works. The beauty of the oviform was shown to be an accident of the organic fitness of the egg, the mere coincidence of its appositeness to taste—the form itself may be separated, or divorced, from the natural fitness of the organism to which it belongs, and may be used in a number of different ways for the gratification of the eye, and for many purposes with which it had originally nothing to do. Now this separation or divorcement of the beauties of nature from the organisms of which, scientifically speaking, they were the accidents, is an important function of fine art. We not only separate the oviform, but the human form, and other beautiful forms from the organisms, the organic fitnesses in nature to which they belong, and employ them in fine art productions. How, then, it may be asked, are we to reconcile the fine arts with the principle of adaptation to purpose? In this wise, every work of fine art has some purpose of its own to subserve, a purpose determined chiefly by its subject, and in proportion as it fulfils this end is it successful, and if the end be great, is it fit and excellent. The satisfaction of the critical judgment, of good taste, is an end and purpose in itself. The greatest works of fine art now existing have been rated excellent from their adaptation to their purposes as works of art. Moreover, when we come to apply fine art to utilities, the critical taste demands that it have some consistent relation to them, although the forms of the utilities themselves be merely used as pegs, or pretences, on which to hang fine art, as in the case of Flaxman's Achilles Shield, the Portland Vase, &c. The principle of adaptation to purpose is as applicable to works of literature as it is to the plastic arts. Let societies and individuals, however, strive as they may to promote good taste, little or no progress will be made towards a higher development of the fine arts, and of the art manufactures, till a consensus of educated opinion be brought to bear upon them. A discriminating demand by the titled and by the wealthy for their continuous production has ever proved a most potent and effective stimulus to excellence. In default of such a demand, any attempt to force art by technical procedure will, in a great measure, prove abortive, as well as a waste of time and a waste of money.—*Journal of the Society of Arts.*

## Jubilee Fountain and Clock Tower for Stratford-on-Avon.

A LOFTY, spire-like and highly ornamental drinking fountain, with clock tower, is now being built in the Rother Market, Stratford-on-Avon, at the expense of Mr. George W. Childs, of Philadelphia, who, by this munificent and noble gift to the birthplace of Shakespeare, supplies the inhabitants of the town with what has long been felt to be one of its most pressing needs. It will be a durable and beautiful memorial of the friendly feeling existing between the two nations in this Jubilee Year.

The base of the tower is square on plan, with the addition of boldly projecting buttresses placed diagonally at the four corners, terminating with acutely pointed gablets surmounted by a lion bearing the arms of Great Britain alternately with the American eagle associated with the stars and stripes. On the north face is a polished granite basin, having the outline of a large segment of a circle, into which a stream of water is to flow constantly from a bronze spout; on the east and west sides are large troughs, of the same general outline and material, for the use of horses and cattle, and, beneath these, smaller troughs for sheep and dogs. On the south side is a door affording admission to the interior, flanked by two shallow niches, in one of which will be placed a barometer, and in the other a thermometer, both of the best construction. Immediately over the basins and the door are moulded pointed arches, springing from dwarf columns, with carved capitals. The tympanum of each arch is filled by geometric tracery, profusely enriched with carvings of foliage.

In the oblong spaces between the margins of the basins and the opening of the arches are the following inscriptions, cut into the stone :—

I.

The gift of an American citizen, George W. Childs, of Philadelphia, to the town of Shakespeare, in the Jubilee Year of Queen Victoria.

II.

In her days, every man shall eat, in safety
Under his own vine, what he plants; and sing
The merry songs of peace to all his neighbours.
God shall be truly known; and those about her
From her shall read the perfect ways of honour,
And by those claim their greatness, not by blood.
*Henry VII.*, Act V., Scene 4.

III.

Honest water, which ne'er left man i' the mire.
*Timon of Athens*, Act I., Scene 2.

IV.

Ten thousand honours and blessings on the bard who has gilded the dull realities of life with innocent illusions.—*Washington Irving's "Stratford-on-Avon."*

The next story of the tower has on each face a triple arcade with moulded pointed trefoiled arches on slender shafts. The arches are glazed, and light a small chamber, in which the clock is to be placed. At the corners are cylindrical turrets, terminating in conical spirelets in two stages, the surfaces of the cones enriched with scale-like ornament. In the next story are the four dials of the clock, under crocketed gables, with finials representing "Puck," "Mustard Seed," "Peas Blossom" and "Cobweb." The clock faces project slightly from a cylindrical tower flanked by four other smaller three-quarter attached turrets of the same plan; from the main central cylinder springs a spire of a slightly concave outline, and the four turrets have similar but much smaller spirelets, all five springing from the same level, and all terminating in lofty gilded vanes. Immediately below the line of springing is a band of panelling formed of narrow trefoiled arches. The central spire has on four opposite sides gableted spire-lights, and, at about one-third of its height, a continuous band of narrow lights to spread the sound of the clock bells. The height from the road to the top of the vane is 50 feet. The clock will be illuminated at night.

The materials of which the monument is being constructed are of the most durable kind—Peterhead granite for the base and troughs, and for the superstructure a very hard and durable stone, of a delicate grey colour, from Bolton Wood, in Yorkshire. The architect is Mr. Jethro Cossins, of Birmingham.

## British Association.

THE fifty-seventh annual meeting of this Association will be held at Manchester, and will commence on Wednesday, August 31, 1887. The first meeting of the General Committee will be held on Wednesday, August 31, at 1 p.m., for the election of the president and sectional officers, and the despatch of business usually brought before that body. The General Committee will meet again on Monday, September 5, at 3 p.m., for the purpose of appointing officers for 1888, and of deciding on the place of meeting in 1889. The concluding meeting of this Committee will be held on Wednesday, September 7, at 1 p.m., when the report of the Committee of Recommendations will be received.

The first general meeting will be held on Wednesday, August 31, at 8 p.m. precisely, when Principal Sir William Dawson, C.M.G., M.A., LL.D., F.R.S., will resign the chair, and Sir H. E. Roscoe, LL.D., M.P., F.R.S., President-elect, will assume the presidency, and deliver an address. On Thursday evening, September 1, at 8 p.m., a soirée; on Friday evening, September 2, at 8.30 p.m., a discourse on "The Rate of Explosion in Gases," by Professor H. B. Dixon, M.A., F.R.S., F.C.S.; on Monday evening, September 5, at 8.30 p.m., a discourse on "Explorations in Central Africa," by Colonel Sir Francis de Winton, K.C.M.G., R.A.; on Tuesday evening, September 6, at 8 p.m., a soirée; on Wednesday, September 7, the concluding general meeting will be held at 2.30 p.m.

The following is a list of the sectional officers:—*A.*—Mathematical and Physical Science—President, Professor Sir R. S. Ball, M.A., LL.D., F.R.S., Astronomer Royal for Ireland; Secretaries, R. E. Baynes, M.A. (Recorder); R. T. Glazebrook, M.A., F.R.S.; Professor H. Lamb, M.A., F.R.S.; W. N. Shaw, M.A. *B.*—Chemical Science—President, Edward Schunck, Ph.D., F.R.S.; Secretaries, Professor P. Phillips Bedson, D.Sc. (Recorder); H. Forster Morley, M.A., D.Sc.; W. Thomson, F.R.S.E. *C.*—Geology—President, Henry Woodward, LL.D., F.R.S.; Secretaries, J. E. Marr, M.A.; J. J. H. Teall, M.A.; W. Topley (Recorder); W. W. Watts, B.A. *D.*—Biology—President, Professor A. Newton, M.A., F.R.S.; Secretaries, C. Bailey, F.L.S.; F. E. Beddard, M.A.; Walter Heape (Recorder); W. L. Sclater, B.A.; Professor H. Marshall Ward, M.A. *E.*—Geography—President, Major-General Sir Charles Warren, R.E., G.C.M.G., F.R.S.; Secretaries, Rev. L. C. Casartelli, M.A., Ph.D.; J. S. Keltie; H. J. Mackinder; E. G. Ravenstein (Recorder). *F.*—Economic Science and Statistics—President, Robert Giffen, LL.D.; Secretaries, Rev. W. Cunningham, B.D., D.Sc. (Recorder); F. Y. Edgeworth, M.A.; T. H. Elliot; Professor J. E. C. Munro, LL.D. *G.*—Mechanical Science—President, Professor Osborne Reynolds, M.A., LL.D., F.R.S.; Secretaries, C. F. Budenberg, B.Sc.; W. Bayley Marshall; E. Rigg, M.A. (Recorder). *H.*—Anthropology—President, Professor A. H. Sayce, M.A.; Secretaries, G. W. Bloxam, M.A. (Recorder); J. G. Garson, M.D.; A. M. Paterson, M.D.

## The Merchandise Marks Bill.

THE following are the amended clauses of the Bill which relate to watchmakers, to which, for the purpose of comparison, we append the original clauses.

8. Where a watch case has thereon any words or marks which constitute, or are by common repute considered as constituting, a description of the country in which the watch was made, those words or marks shall *primâ facie* be deemed to be a description of that country within the meaning of this Act; and the provisions of this Act with respect to goods to which a false trade description has been applied, and with respect to selling or exposing for or having in possession for sale, or any purpose of trade or manufacture, goods with a false trade description, shall apply accordingly.

9. (1.) Every person who sends or brings a watch case, whether imported or not, to any assay office in the United Kingdom for the purpose of being assayed, stamped or marked, shall make a declaration declaring in what country or place the case was made; if it appears by such declaration that the watch case was made in some country or place out of the United Kingdom, the assay office shall place on the case such a mark (differing from the mark placed by the office on a watch case made in the United Kingdom) and in such a mode as may be from time to time directed by Order in Council.

(2.) The declaration may be made before an officer of an assay office, appointed in that behalf by the office (which officer is hereby authorised to administer such a declaration), or before a justice of the peace, or a commissioner having power to administer oaths in the Supreme Court of Judicature in England or Ireland, or in the Court of Session in Scotland, and shall be in such form as may be from time to time directed by Order in Council.

(3.) Every person who makes a false declaration for the purposes of this section shall be liable, on conviction on indictment, to the penalties of perjury, and on summary conviction to a fine not exceeding twenty pounds for each offence.

### Original Clauses.

8. Where a watch case has thereon any words or marks which constitute, or are by common repute considered as constituting, a description of the country in which the works of the watch were made, those words or marks shall *primâ facie* be deemed to be a description of that country within the meaning of the principal Act and this Act; and the provisions of the principal Act and this Act with respect to goods with a covering to which a false description relating to the goods has been applied, and with respect to selling or exposing for sale goods with a false description, shall apply accordingly.

9. Whereas the marks placed upon watch cases by the assay offices in the United Kingdom have been frequently treated as indications of the British origin of the cases so marked, and also of the works contained therein, and for the purpose of preventing fraud in connection with watches it is expedient to make further provision respecting the marks to be placed on watch cases: be it therefore enacted as follows:—

(1.) When a watch case imported into the United Kingdom is sent to an assay office in the United Kingdom for the purpose of being assayed, stamped or marked, the assay office shall place on the case such a mark (differing from the mark placed by the office on a watch case made in the United Kingdom) and in such a mode as may be from time to time directed by Order in Council.

(2.) Every person who sends a watch case, whether imported or not, to any assay office in the United Kingdom shall make a declaration as to the country of origin of the works which, according to the best of his information and belief, the case is intended to contain: and where such a declaration is made, the assay office shall mark on the case, in addition to any other mark, such words indicating the country of origin of the works, and in such mode as may be from time to time directed by Order in Council.

(3.) Any person who makes any such declaration falsely shall be liable to punishment for perjury.

(4.) In this section "country of origin" means the country where the works are made.

In the House of Lords, on the 26th ult., Lord Stanley of Preston moved the second reading of the Bill.

Lord Herschell expressed his satisfaction that there was now a prospect of a Bill dealing with the important subject of fraudulent trade marks passing into law.

The Lord Chancellor observed that, as the Bill tended to reverse the principle of the criminal law by throwing the onus of proof on the accused, the principle would require to be somewhat safeguarded in Committee.

The Bill was read a second time.

## The Ruby Mines of Burmah.

In the House of Commons last month, Sir J. Gorst, in reply to Mr. Bradlaugh, said :—The position of Messrs. Streeter in reference to the Burmah Ruby Mines is at present one of expectancy. They have offered an annual payment of four lakhs of rupees for a licence to work the Ruby Mines under certain conditions in a certain defined area. Their offer is now before the Secretary of State in Council. Their first application was received by the Government of India in February, 1886. The negotiations were conducted by the Chief Commissioners of Burmah. No tenders for working the mines were invited by the local authorities, but the willingness of the Government of India to receive tenders was well known at the time when Messrs. Streeter's first application was received. No person other than a Mr. Ungar applied for permission to visit the Ruby Mines, and was refused by the local authorities. His application to visit the mines was made in December, 1886. No engineer and staff in the employment of Messrs. Streeter, together with machinery for working the mines, has ever been escorted to Mojok. Despatches have recently been received from India on the subject. The Secretary of State has directed these despatches to be laid before Council in the usual way, and the question of the best mode of disposing of the mines will be in due course considered by the Secretary of State in Council. As soon as any final decision has been arrived at, the Secretary of State will be happy to communicate it to Parliament, and he will willingly present such papers on the subject as can, with advantage to the public service, be laid upon the table of the House.

Later on Sir J. Gorst stated that he wished to be allowed to amplify an answer he gave last week to the hon. member for Northampton respecting the Ruby Mines in Burmah. The Secretary of State had received the following telegram from the Viceroy :—"I find the statement that Streeter's people are not at work on the mines requires qualification, for Crosthwaite has just informed us that he had authorised his Deputy-Commissioner to permit persons who wished to dig for rubies to do so under the old system and without the use of machinery, as provisional means of enhancing revenue until final decision can be arrived at in regard to the disposition of the mines, and that a written permit had been issued to Streeter's son, as it might have been to any or similar applicant. Crosthwaite adds that he considered this an ordinary act of the local Executive, and not of such importance to be reported to the Government of India. It is quite a distinct matter from leasing of Crown monopoly right, on which action is suspended pending your decision"—that was the Secretary of State.

Mr. Bradlaugh would hardly call that an amplification, for it was rather a contradiction; and said that in view of the absolutely contradictory answers which he had received during the past twelve months with reference to the Burmah Mines, he begged to ask the First Lord of the Treasury whether he would take care that papers dating from February, 1886, were laid on the table forthwith, so that the House might form a judgment on the subject.

Mr. W. H. Smith said there would be no delay in laying the papers on the table.

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On the 26th ult. Sir J. Gorst, replying to a series of questions on this subject by Mr. Watt, said :—The Secretary of State can, after careful inquiry, find no trace of any assurances being given to Mr. Streeter, Jun., before he left London, that he would get a permit to work the Ruby Mines. He had no information about Mr. Streeter's arrangement for a staff. The Secretary of State has no information as to the third member of the syndicate. The inquiry now instituted by the Secretary of State has reference solely to the best mode of disposing of the Ruby Mines. The allegation that certain Government officials were interested in the syndicate is now heard of by the Secretary of State for the first time. If any such allegation is made by a responsible person and supported by *primâ facie* evidence, the Secretary of State will cause inquiry to be made. I could not state to the House, in answer to a question, the nature of recent despatches without unduly trespassing upon the time of the House.

## The Birmingham Jewellery Trade.

In a letter to the *Birmingham Daily Post*, Mr. S. Wall Richards says :—I am deeply interested in all that pertains to my native town, good old Brum ; and as I see the *Daily Post* every morning I keep in touch with all that is going on, rejoicing in its triumphs and sympathising with its misfortunes. Having been engaged for many years as a manufacturer in one of the branches of the jewellery trade, I should like, if you would permit me, to offer a few suggestions in reference to this industry, and what I consider its probable future, for I do not for a moment think that it is going to die, though it is sick.

Just for a moment we will consider the jewellery trade "a fashion trade," pure and simple. Compare it with other fashion trades and then see how it stands. Do we hear of prostration in the millinery and dressmaking branches and the trades that are adjuncts to the filling in of the many divisions of a lady's wardrobe? Do we hear of such depression in the fashion branches of the tailoring or outfitting, or the hatters' or hosiers'? On the contrary, I maintain that all of these are growing in importance, are flourishing in fact. And if so, how is it? My answer is this, that when the jewellers collectively (individually it is almost impossible) do for their industry what is done for those fashion branches I have mentioned, the jewellery trade will be a steady and prosperous branch of industry. I shall at once be asked : What do the fashion trades do that the jewellers omit? My answer is that they deluge the country with fashion literature. Look at the weekly fashion journals and magazines, the press notices that are constantly appearing in every conceivable and imaginary form ; even ordinary weekly newspapers have their "Ladies' column" devoted to the same end—namely, educating and stimulating the public what to wear, what to appear in, what is most becoming, and how to look nice, which every woman will do, or strive to do, to the end of time. If all of these mediums suddenly ceased their teaching and preaching, what a collapse! What a widespread depression there would be in every fashion trade I have referred to. Writers who like to dwell upon the progress of the age, not unfrequently refer to the improved taste in dress as now worn by both sexes—thanks to the teaching of the fashion journals.

To me, Sir, it is remarkable that so little effort has been made, so little done, with reference to developing a taste for jewellery—how to buy it, and how it should be worn. It may be ungallant to say so, but I am afraid that very few know how to wear jewellery properly. A lady would be shocked if she were told that the same kind of dress she wore at breakfast would do to appear in at dinner, or that a walking costume would do for a ball, or that it would be in order to pay a visit of condolence to a bereaved friend in the attire in which she would attend a concert. She has been taught differently by the fashion journals, and that a suitable costume is required for each occasion. But how about the jewellery to be worn with each? There would be minute particulars about the trimming of each bonnet, the colour of the gloves, &c.; but whoever sees a paragraph about jewellery—how that should be worn? The probability is that half a suite of coloured gold would be made to do duty on three of the occasions I have enumerated, and a mutilated suite of bright gold jewellery on the others. Till ladies are told, and told often, that it is bad taste to wear jewellery only according to certain rules and canons, they will continue to wear it as they do now—and that is anyhow. When ladies are taught to be as careful in selecting their jewellery as they are in selecting their wardrobes, they will be as proud of one as of the other, and then a bright future is in store for the "trade." I could enlarge upon this, but your space forbids until some future occasion.

What is the immediate remedy? Why, the jewellers of Birmingham should combine and originate a fund so that the fashion journals could be subsidised, and a column (more or less) be devoted to their trade every week, in which well-written articles should appear and notices in every form. The public have yet to be educated, the demand has to be created as well as supplied. I do not know an industry which has such resources for producing

articles of beauty and novelty as the jewellery trade, and I speak with knowledge when I say that the jewellers of the continents of Europe and America are nowhere in the race, compared with Birmingham, in the variety and elegance of their productions. But many, very many, of the choicest novelties, for the want of publicity, are in vain, and with the poet one may say—

"Full many a gem of purest ray serene
The dark unfathomed caves of ocean bear,"

for beyond being seen by a few capricious middlemen, the public know them not; whilst an enterprising maker of a pretty garter or a hideous "dress improver" can, by advertising and judicious advocacy in fashion journals, stimulate demand and make a market.

## The New Gold Jubilee Medals.

AT the Trial of the Pyx, at Goldsmiths' Hall, the new gold Jubilee Medals were privately shown to the jury of the Company, and they are now being issued from the Mint. With regard to the crown, as is observed by a contemporary, the same objection will probably be taken as has already been raised with respect to it in the coins. This "round and top of sovereignty," like the other, looks rather unbecomingly small, and does not poise so securely on the head as it might do. The artist, it may be presumed, depicted accurately what was placed before him for the purpose. He is not to be held responsible for the shape or relative dimensions of the crown, or for the position it holds upon the head. But neither the shape nor position is nearly so satisfactory as in the beautiful medal struck to commemorate the proclamation of Her Majesty Empress of India. Nevertheless, Mr. Boehm's large medallion, of which this obverse is a reduced copy, is an exquisite work of art. It has undoubtedly suffered somewhat in the process of translation from a large plaster cast to a small steel die. For this translation Mr. Boehm is also responsible, and it may be presumed, therefore, that whatever deterioration may be detected in the second phase of the work has occurred in spite of the most painstaking effort, and must be considered unavoidable. In the medal there is a certain hardness of feature not to be found in the medallion, and in the veil and bust are one or two stiff and awkward lines entirely the work of the steel die. The back edge of the veil, scarcely perceptible in the original work, comes out from the die a strong, straight line, very objectionably forming a right angle with the lower extremity of the bust, and doing much to impart the tilting appearance to the crown. The elaboration of the lace in the veil has also, unfortunately, come out in two or three horizontal lines, which to a large extent destroy the idea of lace. The tool marks beneath the bust are moreover unpleasantly emphasised, though quite unobjectionable in the plaster. These awkward little details are to be especially deplored, because, though each is slight in itself, together they seriously detract from an otherwise admirable work of art. This obverse of the gold medal is almost a thing of beauty. In the original work, as we have said, it is quite so. But after all criticism, the wonder really is that such a work as Mr. Boehm has produced as a medallion can be reduced to so small a size and reproduced in a steel die with so little loss of its original artistic merit. On the bust are shown the Victoria and Albert Order and the Imperial Order of the Crown of India.

The reverse of the medal is from a design by Sir Frederick Leighton, P.R.A. This is not open to the same kind of criticism, partly no doubt from the nature of the design, which consists of an allegorical group of small figures. For a description of it we may quote from what we take to be the artist's own account:—"In the centre, the British Empire sits enthroned, resting one hand on the sword of justice, and holding in the other the symbol of victorious rule. A lion is seen on each side of the throne. At the feet of the seated figure lies Mercury, the god of Commerce, the mainstay of our Imperial strength, holding up in one hand a cup heaped with gold. Opposite to him sit the geniuses of Electricity and Steam. Below, again, five shields banded together bear the names of the five parts of the globe—Europe, Asia, Africa, America and Australasia—over which the Empire extends. On each side of the figure of Empire stand the personified elements of its greatness—on the right (of the spectator), Industry and Agriculture; on the left, Science, Letters and Art. Above, the occasion of the celebration commemorated is expressed by two winged figures representing the year 1887 (the advancing figure) and the year 1837 (with averted head), holding each a wreath. Where these wreaths interlock, the letters V.I.R. appear, and over all the words 'In commemoration.'" This elaborate group was first designed by Sir Frederick Leighton in a medallion about eleven inches across, and it will be easily understood that when a medallion of this size, comprising so large a number of figures, comes to be reduced to the size of a crown piece or so, there can be no very great minutiæ of detail. Its beauty must consist mainly in the grouping and posing of the figures, and in these respects we think the general verdict will be that this reverse is a work of consummate skill.

Of course the work has involved consultation between the respective artists and the Deputy Master of the Mint, the Hon. C. W. Fremantle, C.B., who, with the superintendent of the operative department, Mr. Robert A. Hill, is responsible for the actual production of the medals, which in point of workmanship fully sustain the high reputation of the English Mint for first-rate execution. So far as the mechanical production is concerned, these medals probably cannot be surpassed.

## The Princess of Wales and the Birmingham Jewellery Trade.

A COMMUNICATION has been received by Mr. J. Jacobs from Colonel Stanley Clarke, private secretary to the Princess of Wales, to the effect that Her Royal Highness had been pleased to inspect the whole of the specimens of jewellery submitted to her by the deputation of Birmingham jewellers appointed for the purpose at a meeting recently held at the Grand Hotel. The Princess expressed herself well pleased with the work and selected several articles for purchase. The class of work selected by Her Royal Highness is of the heavy filigree description, which gives greater employment to working jewellers than any other. Among the articles selected are brooches and earrings, and it is earnestly hoped that the action of the Princess will revive a fashion in the wearing of jewellery which will be of the utmost benefit to the trade. If this class of work can be successfully introduced by the shopkeepers throughout the country to the customers, a large amount of employment will be found for hundreds of men who are at present existing under most depressing circumstances. Councillor Charles Green, one of the committee of jewellers appointed to submit the specimens to Her Royal Highness, returned on the 23rd ult. to Birmingham, taking with him the remainder of the articles.

The *Birmingham Daily Gazette* understands that, at an early date, it is intended to call a meeting of the whole trade in Birmingham to consider the primary cause of the great and almost unparalleled depression, and also certain grievances which have long been talked over amongst jewellers, but which have not yet been definitely dealt with. Among other matters to be discussed will be the extremely low prices obtained for such articles as Hall-marked alberts in silver and gold, and Hall-marked bracelets. The retail prices of these, it is said, bring scarcely any remuneration to the manufacturing jeweller or to the working men. Other matters which will be brought up are the excessively long terms in vogue in the trade and the ruinous system of "appro.," and it is hoped that the outcome of the meeting will be some arrangement between merchants and manufacturers, and, if possible, retail dealers, by which prices may be adjusted on more equitable terms. It has become painfully apparent to everyone that something must be done to relieve the trade of the heavy depression which exists, the failures of late having been of alarming frequency.

# Kashmir.

By William Simpson, R.I., F.R.G.S., Hon. Assoc., R.I.B.A.

"If woman can make the worst wilderness dear,
Think, think what a heav'n she must make of Cashmere!"

KASHMIR is now the official form for the word we have so long known as "Cashmere." The Indian Government have adopted a new spelling for most of the names of places, and this will explain why the quotation from "Lalla Rookh" differs from the word as given at the head of this article. The description of Kashmir as a "valley" is accurate enough, but the term does not quite convey the character of the locality. It is agreed on all hands that it was at one time a lake, and that as the waters of the Jhelum slowly wore away the opening at Baramula, the level of the lake fell, and in time the bed became dry land; even yet much of it is *jeel* or marsh, besides which there are lakes: among them is the celebrated "Lake of Cashmere;" near to Baramula is the Wulur Lake, a large sheet of water—it is ten miles in one direction and about six in the other—which might be described as part of the original lake not yet dried up. Instead of being like a valley, this old lake bed has the appearance of a great plain, for it is stated as being about 100 miles in length, and that in its widest part it extends to 60 miles. Being surrounded by high mountains, like a rampart all round, which are white with snow the greater part of the year, it is a perfect realisation of the "Happy Valley" of Rasselas. By all it is familiarly known as the "Happy Valley," and Moore calls it the "Valley of Bliss." Being about 6,000 feet above the sea, these descriptive terms require no arguments for their acceptance to those who reach its grateful coolness from the plains of India when the summer sun is blazing.

The visitor to Kashmir will find himself on his first arrival surrounded by a crowd of boatmen, and the mode of escape from their presence is to hire one of them. The engagement includes boat and men as well, at so much a month: they attend upon you at all hours, for the boat takes the place of a horse or carriage; by means of the river, the canal and the lakes, your boatman can take you to almost any spot. The first point of attraction is generally the *dall* or lake; this lies close to the town of Grinugger, and is reached by the "Apple Tree" canal. That part of the lake nearest the town is shallow, while the opposite shore skirts the base of the hills, where there is more depth of water. The shallow side is covered with aquatic plants, which grow in such profusion that the boats can only pass along narrow channels kept open for the traffic. Among the vegetable growths are many flowering plants with bright tints; but the queen of flowers here is the lotus. Great stretches of space are covered with it; its large green leaves float on the surface, and the flowers are in such profusion, that the eye as it gazes along the distance catches bright gleams of a beautiful rose tint. It is this ample crop of leaf and flower which justifies Moore's description of the lake as being "like a garden"—

"With the rich buds that o'er it lie,
As if a shower of fairy wreaths
Had fallen upon it from the sky!"

The seeds of the lotus are not unlike green peas; they are very pleasant to eat, and are supposed to produce the feeling of forgetfulness. Moore realised the beauty of the spot from the accounts of others, and it is surprising to find how accurate he has been. "Lalla Rookh" is a perfect guide-book to the lake of Cashmere, and the reader may be referred to it if he desires further information; although tempting it might be to describe such a spot, and recall the many memories of my visit, I must refrain, as I have other things to describe which may be of some interest to the readers of this journal.

Whoever reads "Lalla Rookh"—and I refer more particularly to the last tale in that book, which is called "The Light of the Harem," where the scene is laid in Kashmir—he will find that although there is so much minuteness of detail, Moore gives not the slightest hint in relation to the personal ornaments or the jewellery worn by the fair creatures of his fancy; his authorities had evidently overlooked such information, or, more probably, they had not had the opportunities of seeing how the Kashmir ladies decked themselves. In former times, visitors to the Happy Valley were few, but now this is all changed, and every summer sees a crowd of people who are glad to escape from the plains to the less fervent climate of the hills. My visit took place as far back as the summer of 1861, when I spent about six weeks in the valley. I had the advantage of visiting the different localities with General van Cortlandt and his family, he being the Resident for that year. The event which enables me to write this article resulted from the visit of two friends, who, knowing that my object was to see and sketch whatever was characteristic of the country, proposed that they would try, for my benefit, to realise the days of "Lalla Rookh." To do this, they proposed to have a Nautch, and some of the most noted dancing girls were engaged; and to carry out the idea fully, it was to take place in the Shalimar Gardens, and in the very building, described by Moore, where Noor Mahal had sung—

"And, oh! if there be an Elysium on earth,
It is this, it is this."

Moore (in a footnote) calls it a "saloon"—a term not very Oriental in its associations, and in this case not very accurately descriptive—it is a class of erection common in Indian gardens, and is called a *baradurreh*, which means twelve doors. It is a summer house, with three doors on each of its four sides, to allow the air to come in from any quarter it may chance to blow. This particular one in the Shalimar is very handsome, being constructed of black marble, and very beautifully carved. A small stream, flowing from the hills, has been led through the gardens, and the water surrounds the *baradurreh*; small cascades have been formed, and jets of water can be made to play around, giving a touch of beauty along with the feeling of coolness to the spot.

Our party was to be a very small one; if I remember right there were only three invitations, among which was the General, with whom I went, crossing the lake in a boat, reading "Lalla Rookh" as we were paddled along. The programme included a dinner, which we sat down to about sunset; the fountains were playing, and a cascade had been turned on where there were small niches in the wall: lights had been placed in these and the water fell in front of them, producing a very beautiful effect. While we were at dinner the men had been busy lighting *chirags;* these are small earthen cups containing oil and a wick, with which illuminations are produced: they were put in rows along the edge of the water. When we had finished dinner and moved into the other verandah, where coffee and cigars were to be enjoyed, the whole place was bright with the illuminations, the fountains were murmuring, and we found the Nautch girls had arrived, each with her *baji-wallahs* or musicians, and were ready to begin. I forget now what the first song was, most probably it was "*Taza be taza*—Now be now"—a very beautiful song: the words are by Hafis, and it is a great favourite in Kashmir. The effect was wonderful. I had been to nautches* before, but they are performances which no one cares to see a second time; in this case everything was different. The beauty of the spot may be imagined from the description already given: it was purely Oriental, the word "enchanting" might be used to describe it, but that was only a small part of the influence. We knew it was the scene as pictured in "Lalla Rookh," and which we had all been reading—page by page we had gone over the book, often on the very spot described—if Moore's descriptions were all faithfully true, the fair creatures before us were equally so. We had all become "lotus eaters," and had forgotten the outer world entirely. While the dance went on our thoughts only turned to the times of Jehanguire and Noor Mahal. The illusion was complete; for the moment we seemed as not belonging to the 19th century. Had a jin or a giant appeared amongst us, or a peri from paradise, such an appearance would not have been thought out of place; we had reached such a state that none of us would, for the time, have doubted a single tale in the "Thousand and One Nights." On comparing notes afterwards, this was the condition we all admitted ourselves to have reached. A very slight incident

*Nautchna* is the verb "to dance."

at the end of the dance showed how perfectly we had been entranced. When the two girls had finished the first performance and sat down among their followers, *hookahs* or pipes—better known perhaps as "hubble-bubbles"—were ready for them; the gurgling sound produced by the smoke as it is inhaled through the water is so familiar to everyone in connection with the natives, and more particularly with one's own servants at the present day, that the first gurgle of the smoke at once produced the disenchantment, and we were brought back instantly to the usual life of to-day as it is in India. The transition back to reality was thorough, but it showed how strong the spell upon us had been. The sensations of these few minutes were in themselves an ample reward for the pilgrimage to Kashmir.


Fig. 1.—Goolee, a Nautch Girl of Kashmir.

Luckily, in addition to a general sketch of the scene, I took portraits of some of the girls, and as these include the ornaments they wore, I am able to give some details. It may be mentioned that some of the Kashmiris are so fair that they have a touch of red in their cheeks. This was the case with Goolee (fig. 1), the principal performer of the evening: her name means rose or rosy.* To understand her head-ornaments it would be as well to look back to the number of this journal for October last, where there is a sketch of a Delhi lady, and compare it with the portrait of Goolee. The first impression will be that the two are entirely different in style, but this is more apparent than real. Goolee wore a small cap of rich *khin-khob*,† and the ornaments are attached to this; but these ornaments, it will be noticed, have a marked identity with those worn in the other case. This resemblance consists in both being in the form of crescents, with small pendants round their outer edge; the Delhi lady wore hers irregularly grouped, while Goolee had them symmetrically arranged—a large one in the centre and two smaller ones on each side—only two of these last are seen in the portrait, as the chuddar hid the others: the stones within the crescents were emeralds and rubies. A Nautch girl could not be expected to have the same wealth of jewellery on her person as that worn by a rich lady, still she had a heavy necklace of gold with stones in it, and a smaller one with pearls. There was a third, with a large pendant attached; this was of gold with rubies, and contained an emerald of considerable size. It need scarcely be repeated here that the nose ornament in the left nostril is common to all Indian women, rich or poor. In some cases it is a small jewel, often a pearl, but oftener it is a gold wire ring, which varies a good deal in size (sometimes it is quite three inches in diameter). *(To be continued.)*

* *Gool*, or *gul*, is Persian, and means generally a flower.

† *Khin-khob* is a kind of cloth made of silk and gold.

# American Items.

THE Waltham *Tribune* says the Waltham factory is making 1,232 watches per day, and that the hands average a monthly earning of 52 dols.

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The New York correspondent of the American *Manufacturing Jeweler* says that fashions remain about the same in that city, with the exception, perhaps, of a resuscitation of the pendant earrings. Almost all of the retail jewellery stores in the city report a demand for these, but the manufacturers do not seem to be aware of it. Why they should be called for no one knows. It is one of the caprices that the public sometimes enjoys, but it will be a good thing for the makers of gold jewellery, and enable them to get some of the patronage which the precious stone dealers have enjoyed so long. The gem-set objects still find favour, however, and insect pins appear to be as fashionable as ever. Silver belts, either in plain bands or in massive links, are much worn, the bands appearing to have the preference. This display of the precious metals in articles of raiment, which we have been accustomed to look for among Oriental and barbaric peoples, appears to be steadily growing among our ladies. Even the parasol finds room for jewels incrusted in its stick and for yellow gold effects elsewhere that enhance its value to three or four hundred dollars each. These, however, cannot be called staple articles, and few have them except the newly rich and ostentatious folk. Both brooches and bar pins have a continued demand without apparent interference one with the other. Pendant settings for jewels are assuming a strong leadership, for the reason probably that the swinging motion shows to best advantage the brilliancy of the stones, and we may expect soon to see the fair sex with earrings of this description as well as other objects. Some years ago it was deemed bad taste for a lady to wear diamonds when on the street, but now one can hardly meet a well-dressed woman who has not diamonds in her ears, upon her breast and arms, or in the shape of rings which one ungloved hand gives an opportunity for display. Silver jewellery also, while in no way competing with the gold, is greatly worn, and in all the forms which its white colour allows. In fact, nearly everything which ingenuity can invent, whether artistic or not, seems to find some person whose taste is gratified by possession. The difference in forms is regulated solely by the difference in tastes.

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The strike of the New York silversmiths is nearly over. Most of the men, with the exception of the chasers, have returned and agreed to sever their connection with the arbitrary and dictatorial unions. Too much credit cannot be given the manufacturers for their firm stand in the undoubted right which they possess of managing their own business without outside interference. So far as they are concerned, it has settled the question for a long time to come.

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The *Jewelers' Weekly* says that as an example of the way fashion leaves no stone unturned in her unwearied search for novel effects, the present rage for antique and quaint jewellery conspicuously presents itself. Tired of the elegant ornaments with which her dressing-case is replete, seemingly because they are all in good taste and therefore present no striking peculiarity to the eye, my lady starts in quest of something odd—something that will arrest the attention. She delights in Indian moonstones cut into hideous, leering demons' heads, with deep-set diamond or ruby eyes. She orders opals in heavy, rude settings, as they are made by Indian smiths with no other tools than a charcoal brazier and a hammer. A heavy silver belt, fashioned generations ago by village artisans, is her special delight. She decks herself with these quaint suggestions of barbarism and simplicity and feels satisfied that she is *à la mode*. Surely fashion is a wilful and capricious mistress.

# The Gold Supply.

IN a recent lecture at the meeting of the Manchester Geographical Society, Mr. Thomas Cornish, after observing that he had had the opportunity of acquiring a large and varied experience of many of the gold fields of the world, said the great benefits derived from gold mining, or the production of new gold, appeared to him not so well understood as they should be. It had become, he considered, one of the important, if not the most important, industries of the day. It created new wealth, or purchasing power, of a fixed value. It was the direct-acting means of opening up new avenues of industry, which but for it would not be known or required. It had a similar effect on the finance, trade and commerce of the world as steam had on locomotion. All the trade of London for a year would not add an ounce of new gold or four new sovereigns to the coin currency or actual capital of the world. Any party of gold miners, producing any given quantity of gold from the earth, did more real good to the community than did business transactions of any similar body of men engaged in other operations, because the gold so raised became an addition to the working capital of the community by affording additional means of extending its credit and securing its liabilities. The great wave of depression felt in this country during the past few years, and the scarcity of money and remunerative labour which had been and was now so severely felt by our industrial classes, must in a great measure be accounted for by the decreasing supply of new money from our gold-producing Colonies. This had arisen not from want of plenty of auriferous country for exploration and profitable investment, but more from the fact that the gold-mining industry had been neglected and virtually ignored by the general public, and especially by those who had derived the greatest benefits by the production of gold. With the vast mineral resources of the world there need be no fear of exhaustion of the gold supply. What was wanted was increased attention to the industry, the greater use of improved appliances, and a more judicious direction of capital and labour in the development and practical working of the mines and extraction of the gold. There was no reason why the gold supply could not be largely increased and permanently maintained to meet the increasing requirements of nations and individuals.

The rapid strides of material progress in wealth, population, finance, trade, commerce, and industries in America in consequence of the discoveries of gold had been of a massive and wonderful character. The lecturer instanced Denver, Colorado, as a city whose marvellous growth had been built on the prosperity of gold and silver mining. After reviewing at length the gold fields of the Western States of America, of British Columbia, the Central States of America, Guiana and Brazil, the Gold Coast of West Africa, the Transvaal, New Zealand and Australia, he said that gold was also being produced in Russia in considerable quantities, and the Ural Mountains and other districts no doubt contained large tracts of auriferous deposits and quartz reefs. In Transylvania and other parts of Europe gold was also found, and we should probably ere long hear of the Welsh gold mines being set to profitable work. Gold had also been got in Scotland and Ireland, and in all probability further discoveries would yet be made there. He was satisfied that there was ample scope for the profitable employment of tens and hundreds of thousands of extra miners for gold and silver, and would prove more remunerative than any other form of labour.

Professor Boyd-Dawkins said: So far as he could form an opinion, gold seemed to be valuable because it was so hard to get, and the question of putting money into gold mining was exactly the question whether it would pay us or not. In many cases where gold mining had been entered upon, most of the gold obtained came out of the shareholders' pockets. Reef mining was very costly, and prevented us from getting gold where it was undoubtedly plentiful. While we had too little gold, it seemed that we had too much silver. From his own examination of vast areas of silver-producing country in America, he believed there was any amount of silver there almost as yet unworked. He agreed with a remark by the lecturer that it would be well if we had gold mining conducted more scientifically and without a swindling element,

## Note on the Temper of Steel and the means of obtaining it.

WE know that tempered steel loses little by little (in proportion to the degree to which it is re-heated) the properties the temper had given it. Up to about 215°, the effects of the annealing are hardly perceptible, but between 215° and 325° they become very marked and allow of the required quality being given to the steel.

The essential point for obtaining always the same effects is to heat to a determined temperature. The colours the metal takes accordingly as it is heated aid us in this determination, but we may also readily ascertain the temperature directly in a bath or stove by means of a suitable instrument. Mercury boiling at 357°, the thermometer constructed with this liquid can be easily read up to about 330°.

For these high temperatures, the makers furnish thermometers in which a small quantity of azote is introduced above the mercury, which prevents the rupture of the mercurial column and regulates the readings. It is only necessary to take into account the fact that the glass of thermometers exposed to rather extensive variations of temperature itself varies: the capacity of the reservoir changes, and results in a lowering of the zero. The readings given by the thermometer are then too small: but it is easy to determine the correction by plunging the instrument into melted ice, and noting the degree marked: the figure of the degree shows the correction to add to the indications of the thermometer. It is well to repeat this test from time to time, the displacing of zero being often very slow and being able to remain so a long time.

From the practical point of view it is unnecessary to know exactly the temperature other than that to which we are working, provided that the same can always be certainly reproduced: and it is easy to manage with a thermometer of any kind, by making preliminary experiments upon objects of the same nature as those we wish to temper. For heating the objects, we may employ a hot air stove, or better still—especially if it is large enough—a liquid bath in which can be plunged an iron receptacle capable of being closed, containing the objects to be tempered. The thermometer is not plunged in the bath, but in an iron tube immersed in the liquid: this facilitates getting it out and lessens the chance of breaking it. With regard to the liquid, the best is a mixture of lead and tin: the more tin it contains, the more it is fusible. Oil is not suitable, on account of the bad odour it gives off at high temperatures: but paraffin may be used, which has not this inconvenience. If a bath of somewhat large capacity is employed, it is relatively easy to maintain its temperature constant; the objects are thus submitted to the same temperature and tempered uniformly. The temperature not varying, they may also be left a longer or shorter time in the bath.

In the above remarks, gas is indicated as the heating agent: if that cannot be used, petroleum furnaces are recommended for the purpose, provided other conditions allow of an easy and prompt regulation of the temperature. In the case of an air stove, where the variations of temperature are many more to fear, it would be well to have an automatic regulator of the temperature. There exist many models of such among the makers of instruments for the use of chemists.—*Journal Suisse d'Horlogerie.*

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According to the correspondent of *Industries*, the export of machine-made Swiss watches is still on the increase. This is specially the case as regards the consular district of Chaux-de-Fonds, where the value of exports in round figures was as follows: 1886, April £12,000, May £12,900, June £12,000, total £36,900; 1887, April £16,700, May £18,700, June £16,500, total £51,900.

## The Use of the Eyeglass.

WHILE in the opinion of Mr. Brudenell Carter and other eminent ophthalmists, the judicious use of the magnifying glass is by no means injurious to the eye, it is as well to point out that this opinion is but conditional and does not apply to its abuse. On this subject a correspondent of the *Deutsche Uhrmacher Zeitung* says that a watchmaker more often than not thinks to make use of his ordinary sight. It is then the duty of a master to make the pupil appreciate from the beginning of his apprenticeship the advantages he will find in the employment of the eye, and how much time and pain he will by that means avoid, especially in measurings and rough work. Want of habit in the estimation of sizes, or rather, in their exact comparison: inexperience, vanity or convenience: perhaps also the idea of giving more rapidly to the eye the necessary dexterity—all much induce beginners to use the eyeglass which they see employed by the more advanced apprentices. They do as the clown who, not knowing his alphabet, thinks that by putting on spectacles he will be able to read immediately. The responsible master should absolutely interdict the eyeglass to beginners, and, later, not authorise its use until that is necessary. That which at first was only due to vanity or inexperience, becomes in time a necessity and cannot be done without. But what a grotesque and at the same time deplorable effect. Only certain pieces are produced, the thick pieces hardly roughed out, when made by the aid of the glass. It is no excuse to say the work has been badly done because the executor has bad eyes; if he has not a good sight, let him put on suitable spectacles. I know a good many watchmakers who rarely use the eyeglass, and only for fine work. What can be done by one can be done by others: nothing is requisite but a firm will. Those who are not able to dispense with the eyeglass, commit also from habit the unpardonable fault of using glasses too strong, which leave an interval of only two or three centimètres between the work and the glass. This is pernicious for the eyes, because in using short focus glasses the eyes become pained, and if they are continued an enfeeblement of the sight is produced, and in consequence of the excitation of the optical nerves headaches result which in some circumstances may become chronic. The eyeglass for ordinary uses should be weak and allow of an interval of from six to eight centimètres between it and the work. It is quickly got used to and will not produce tiredness of the eyes: this shows that no inconvenience will result. Besides the weak glass, it is necessary to have a strong pebble eyeglass, but the latter is required very exceptionally. With use it sometimes happens that when the eyeglass is held a long time near the eye, the glass becomes blurred, which is very disagreeable. This proceeds from the vapours which emanate from the eye and become condensed upon the glass. It is easy to prevent this by making two holes opposite one another to make the interval between the eye and the glass communicate with the exterior air. These holes are made just above the glass, so that the current of air circulating touches it lightly and prevents the condensations. The glasses of eyeglasses are wiped ordinarily with an old piece of linen or with the leather. These two means are bad, because in proceeding thus the glass is covered with imperceptible rays. It is preferable to make use of silk, or still better, of unglazed porous paper that is not frayed, or filtering paper. It is necessary to breathe on the glass before wiping it.

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Perry & Co., Limited, Steel Pen Makers.—The Directors of this Company have resolved to pay on September 1, out of profits, an Interim Dividend on the Ordinary Shares for the first six months of this year, at the rate of 6 per cent. per annum, free of Income Tax, being at the same rate as for the corresponding period last year. The half-yearly Dividend on the Preference Shares will be paid as usual at the fixed rate of 5 per cent. per annum.

## Jem Carney's Belt.

JEM CARNEY, the light-weight pugilistic champion of the world, arrived in Birmingham on the 11th ult. The belt he has brought back with him has excited a great deal of interest. In design and solid value it is far superior to many of the English belts. At the Victoria Hotel, Liverpool, it has been inspected by hundreds of persons, and in Birmingham it has likewise attracted large numbers of the curious. The trophy, which is of silver and gold studded with diamonds and emeralds, was made in Boston and scales 6½ lbs. It is 38 in. long: the shield or centrepiece is 9 in. deep and 6 in. wide. The upper portion represents a star, and in the centre is set a diamond. There are two plates on each side neatly enamelled and raised from the surface, representing America, England, Ireland and France. On the top of a golden globe are the initials of the donor of the belt, "E. C. H.," studded with diamonds. On both sides are raised laurel leaves. Directly across the face and attached to the lower portion of the globe is a streamer bearing the inscription, "Holske International Challenge Belt." Each side of the medallion is a gold border holding a streamer on which are the words "Light weight." Under the medallion is a large gold eagle holding from its mouth a streamer with the inscription, "Champion of the world." The shield has a neatly engraved border to set off the raised work. Each side of the centrepiece are fourteen gold rods connecting the side plates. The plates each side of the centre are 6 in. deep and 4 in. wide. A photograph of Holske is fixed prominently on the belt, and there are two gold figures, one of Harry Gilmore, and the other of Jack McAuliffe, in fistic attitude. Other adornments are in the shape of a good-sized gold thistle, an emerald, a wreath of oak leaves, and an eagle with wide-spread wings. There are three plates bearing records—one of the contest between Gilmore and McAuliffe, one of the forfeit by McAuliffe to Carney, and the third of the victory of Carney over Jem Mitchell. The belt, as originally ordered, was made for 800 dols., but additional labour has been added, bringing the actual cost up to 965 dols. Carney is very proud of his trophy, and perfectly confident of his power to keep it against all comers.

## A Casket for Sir Richard Moon, Bart.

THE ceremony of inaugurating a few days ago one of the many benefactions of the London and North-Western Railway Co. to the town of Crewe was marked by an interesting personal incident. Sir R. Moon, the Chairman of the Company, whose energy and ability in this post had marked him out for one of the Jubilee distinctions conferred by the Queen, was presented with a valuable casket enclosing an illuminated scroll constituting him the first honorary freeman of the borough of Crewe. The casket was manufactured by Messrs. T. & J. Bragg, of Birmingham, commissioned by Mr. J. Blackhurst, of Crewe, whose local knowledge enabled him to furnish a series of details which have been turned to excellent account in the design. The shape is severe, with justly balanced lines, and mouldings as befitting the great engineering centre of the London and North-Western system, and above a border decorated with British oak leaves and acorns, is a miniature representation in a series on the four sides of the casket of steel rails and the new patent steel sleepers, one of the latest inventions of Mr. Webb, the present Mayor, which have been produced at Crewe Works. The body of the casket, which is richly decorated, has the obverse and reverse divided by caryatide ornaments, indicating respectively Industry, Commerce, Prudence and Progress. The arms of Crewe in enamel, with the motto, "Never behind," occupy the centre in front, while a series of enamel plaques, carefully arranged with the ornament, go entirely round the box. These plaques, carefully painted in colours, have a very brilliant effect against the decorated gold surfaces. The subjects are illustrative of the progress in locomotion which has resulted in the present railway system. First, canal traffic is illustrated, the boat being slowly towed by horse along the bank, in a pretty country landscape; next, coaching, as in the old days. After that comes a correct rendering in enamel painting of the old "Rocket" engine, the badge of the London and North-Western Railway Co.: and, finally, Mr. Webb's most recent locomotive engine—a copy of the 3,000th example turned out at Crewe Works. Enamelled views of the old Crewe Works and of the Mechanics' Institution—the gift of the railway company to the town—occupy the sides. The lid bears, amid other decoration, the crest and monogram of Sir R. Moon, a view of Euston Station in 1837, and of the magnificent tubular bridge over the Menai Straits. The inscription is on the reverse slope of the lid, and the whole work has been carried out to the satisfaction of all concerned.

## The Koh-i-noor.

ACCORDING to Burnham, the Koh-i-noor is the oldest known diamond in the world. No diamond has probably had a more romantic history, or has figured more largely in the affairs of nations and individuals. Tradition assigns it an exceedingly great antiquity, it having been found in the Godavery river, Southern India, between 4,000 and 5,000 years ago, previous to the Indian war celebrated in the great epic, the "Makabharata," and was worn by one of the chiefs who fell in battle on that occasion.

It came into possession of the family of one of the ancient native princes, the Rajah of Malwar, and was transmitted to his successors through many generations, until it passed into the hands of the Mohammedan conquerors of India, at the beginning of the 14th century. It constituted one of the most valuable gems of the Imperial treasury of Delhi, until it was carried off by Nadir Shah, the Persian conqueror, in 1739. After the assassination of Nadir, this gem became the property of the Afghan monarchs, and from them was transmitted to Runjeet Singh, the Sikh hero of the Punjaub, who had it set in a bracelet, and just before his death, in 1839, he was advised to devote it to Juggernaut, but the act was not consummated, and it was left among his other treasures.

The story is told that Nadir Shah possessed himself of the diamond by artifice. He believed that it was concealed in the turban of the dethroned emperor, since it could not be found in the treasury at Delhi, and on the pretext of restoring the conquered ruler to his dominions, which the wily Persian made the occasion of a grand display, he artfully proposed, as a mark of friendship, to exchange turbans with his Imperial guest, an act of courtesy the prisoner did not deem it politic to refuse, and the famous diamond came into the hands of the conqueror, who, on beholding it, exclaimed: "Koh-i-nur," Mountain of light!

On the fall of Nadir Shah's extensive empire Ahmed Shah, the Afghan chief, who established a new dynasty, became the fortunate, or the unfortunate, possessor of this ill-omened treasure—a stone of fate—and from him it descended to his heirs. The last of the line, Shah Soujah, kept this one cherished treasure during his imprisonment and exile, until Runjeet Singh compelled him to sell it for 150,000 rupees. After the subjugation of the Sikhs by the English, and the annexation of the Punjaub to British India in 1849, the civil authorities took possession of the treasury at Lahore, under the stipulation that all the property of the State should be confiscated to the East India Co., and that the Koh-i-noor should be presented to the Queen of England: thus the talisman of Indian sway passed from the land of its birth to the royal treasury of Windsor Castle.

WHITEHALL, JULY 28.—The Queen has been pleased, by Warrant under Her Majesty's Royal Sign Manual, dated 26th inst., to place the name of Samuel Montagu, Esq. (in lieu of that of Lionel Louis Cohen, Esq., deceased), upon the Royal Commission appointed to inquire into the recent changes in the relative values of the precious metals.—*Gazette.*

# Isochronism in Flat and Breguet Springs.

By M. Sandoz.

BY the word isochronism, which is derived from the Greek, meaning equal time, is indicated the property possessed by the pendulum and balance spring of accomplishing their arcs of vibration of different amplitudes in the same space of time. In a pendulum, the only condition required is that its length be such as to make the centre of gravity move according to its cycloid curve; but in the balance spring the means change with the form of the spring. In the spherical or conical springs the extreme curves, constructed after the mathematical rules discovered by Professor Philipps, of the Polytechnic School of Paris, will produce an isochronism very nearly perfect. In the flat springs these curves cannot exist; therefore other means must be resorted to. I shall now give the results of several years of experiment and study embodied in the following theorems:

1. In the flat spring every coil has, theoretically, a point where the vibrations are isochronal. 2. That point of isochronism is determined by the relative position of the two points connecting the balance spring with the collet and stud, called points *d'attache*.

These two propositions form the base of isochronism in the flat spring; therefore the idea generally accredited among watchmakers that the isochronal properties of a flat spring depend on its length is incorrect, since the tenth as well as the twentieth coil of the spring is able to produce isochronism, the only limit being such size of springs as would perfect the freedom of its action.

Freedom of action being necessary for the isochronal properties of the spring to develop themselves, the spring must be bent to the centre. If the first coil is too near, or the curve too flat, so that even a minute part of the spring touches the collet, it will hinder isochronism. Next, the spring must be pinned perfectly tight in the collet and stud, and move freely between the regulator pins.

These conditions being complied with, the watch is run three, six or twelve hours with just strength enough to keep it going; the result is compared with a regulator and set down. Next, the watch is fully wound up, and after a space of time equal to the first trial, the result is again set down.

The watch will generally run slower in the short vibrations than in the long ones, and consequently lose time in the pocket in the last twelve hours of its running. Having set down as a principle that every coil has an isochronal point, we have now to determine that point, remembering that, as a general rule, every increase of length of the spring over that point will cause the watch to gain in the shortest vibrations, and every decrease back of that point will cause it to gain in the long vibrations. This rule is correct only for certain limits, as I shall explain. Supposing that a balance spring of fifteen coils is perfectly isochronal, with the two points *d'attache* just opposite each other, the fourteenth and sixteenth coil, as well as the fifteenth, will produce the isochronism very nearly at the same point. Suppose that we increase gradually the length of that balance spring of fifteen coils, pinned up so that the two points *d'attache* are placed opposite each other, so that its length will now be fifteen-and-a-half coils, the two points *d'attache* are now in a position where they are said to be pinned to the half-coil. The result will be that the balance spring will cause the watch to gain in the short vibrations in the very same proportions in which it has been gaining by the increase of the length of the first half. That change will continue until we reach the same point on the sixteenth coil that we started from on the fifteenth, and the two pins are opposite to each other, at which point we shall again have isochronism. The same method is applicable to the fourteenth coil, with the same results.

Now, it is immaterial whether we take half the coil to the centre or to the outside of the spring, because both of these operations will produce the same results, viz., the change of the relative places of the points *d'attache* of the spring. Therefore the workman has his choice, and is guided by the size of the spring and the weight of the balance; for, taking half a coil to the centre of the spring will not much affect the rate of the watch, but taken outside, the difference will be great. On the other hand, a very short cut to the centre will greatly affect the isochronism, and at the outside a full half-coil will generally produce from fifteen to twenty-five seconds' difference in twenty-four hours. If, then, the watchmaker would produce the greatest possible changes of isochronism in a watch, the change of position of the two points *d'attache* of the spring of one coil around will give him the two highest degrees of gaining and losing in the short vibrations.

It follows from the foregoing remarks that if a watch loses in the last running (short vibrations), the first thing to do is to increase the length of the balance spring from the outside; if the result is good, but not yet sufficient, give still more length: if the result is still worse, it shows that you are too far on the coil. Take back the whole length that you had given in the first operation and draw more length, so as to affect the spring the other way; or, if your spring is already small, or your balance pretty heavy, cut to the centre, so as to come around to the required positions.

Some springs cannot produce the isochronism because of a defect in their make, or on account of a want of homogeneity in the metal. The only remedy for this is a new spring.

In the Breguet spring the isochronism is produced in the same manner as in the flat springs; but great care must be taken in making the curve, for if it is not made in conformity with the principles of Philipps, the isochronism will be disturbed.

Few watchmakers understand the art of adjustment in positions, and those few make it a regular business. It requires of the operator considerable manual skill and reflective powers. The great principle is to equalise the frictions, so that the pivots will offer to the action of the spring the same resistance in the four positions generally required, viz., dial up, XII. up, cock up and III. up.

After having inspected and corrected the train, so that the motive-power is transmitted uniformly to the balance, the pivots and jewels of the lever should be polished and shortened, so as to have very little friction; next, the lever should be poised as perfectly as possible, the notch in the fork where the ruby pin acts should be polished, and the balance jewels made short enough to have the holes square, rounded inside and perfectly polished, the balance pivots well burnished, their ends half-rounded, and the balance poised very carefully. The English method of throwing the balance out of poise, to obtain the same rate in different positions, is not generally accepted, and is considered a bad practice by the most eminent watchmakers. The balance spring is put in its position without the balance, and bent so that the collet of the cock jewel will have the same centres.

The watch being now in good running order, is put on trial for twelve or twenty-four hours, and the rate in each position carefully noted. If there is any difference in the running with the cock up or dial up, this slight defect can probably be remedied by making the ends of the pivots even and equally polished. If the watch loses with XII. up, which is generally the case, and the friction on the balance jewels is reduced as much as possible, the remedy is to increase the friction when the watch is either dial up or cock up. This is done by throwing the balance spring a little out of the centre of the cock jewel, thereby adding to the friction on the pivot end a lateral pressure against the balance jewels. If the watch is well regulated with XII. up and loses with III. up, throw the spring a little toward the figure III.; this operation lifts up the balance when the watch is in losing position, and diminishes the friction of the pivots in the particular case. Making the ends of the pivots perfectly flat has a tendency to cause the watch to gain with dial up or cock up. The sound of the watch must be clear in all positions, or else friction is indicated, such as is due to rough jewels or pivots and the rubbing of the safety pin against the roller.

## Horological Club.

THE Annual Dinner of the Horological Club took place at the "Cock" Hotel, Epping, on Saturday, July 9. The Chair was filled by Mr. J. Oliver, and the Vice-Chair by Mr. H. Bickley, Honorary Secretary of the Club. Among those present were Mr. D. Glasgow, Mr. W. Evans, Mr. A. Jaccard, Mr. T. J. Willis, Mr. L. Donne, Mr. H. P. Isaac, Mr. G. Cotton, Messrs. C. Curzon, W. G. Schoof, F. W. Knight, Willis, Jun., Newbold, Bromley, Robinson, &c. After dinner the loyal toasts were given from the Chair and duly honoured.

In proposing "Success to the Horological Club" Mr. Glasgow observed that the Club was now in the eighth year of its existence—a sufficient proof, if any were needed, of its necessity. Of course, during that time there had been changes in the membership, though many then present had been members from the beginning. As Treasurer of the Club he could assure them—thanks in a great measure to the exertions of their Honorary Secretary—of its sound financial condition, and thought it might now be regarded as a permanent institution of the trade.

"The Benevolent Institutions of the Trade" was proposed by the Chairman and responded to by Mr. Bickley. The toast of "The Club Committee" having been proposed by Mr. Cotton and duly acknowledged by Mr. Evans, Mr. Glasgow, in eulogistic terms, gave the health of the Honorary Secretary. Mr. Bickley, in responding, remarked on the value of social intercourse as a factor in the world's progress. An American philosopher had said that civilisation culminated in bringing a few men round a table; and it was astonishing to think how much art, science and literature were indebted to social intercourse and good fellowship.

In proposing the health of the Musical Director, the Chairman said that the members were much indebted to Mr. Knight and his able coadjutors for their very enjoyable musical evenings, which had become quite a feature of the Club.

Mr. Knight acknowledged the compliment in graceful terms.

The remaining toasts were "The Chairman," proposed by Mr. Willis and duly responded to, and "The Visitors," for which Mr. Donne returned thanks.

## Workshop Memoranda.

A SIMPLE method of making emery wheels, which could also be utilised for making grinding discs or sticks of various shapes, is described in the *Guide Scientifique*. Gelatine of good quality is dissolved in its own weight of water, the operation being conducted in a dark room. To the solution one-and-a-half per cent. of bichromate of potash is added, which has been previously dissolved in a little water. A quantity of very fine emery, equal to nine times the weight of the gelatine, is intimately mixed with the gelatine solution—pulverised flint may be substituted for emery. The mass is moulded to the desired shape and then consolidated by heavy pressure. It is dried by exposure to strong sunlight.

For Plating the better qualities of German Silver, cyanide of silver is dissolved in a solution of carbonate of ammonia. The proportions used are:—

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|---|---|
| Sulphate of silver ... ... ... ... | 156 parts |
| Carbonate of ammonia (dissolved in distilled water) ... ... ... ... ... | 70 ,, |
| Or, Cyanide of silver ... ... ... ... | 134 ,, |
| Carbonate of ammonia ... ... ... | 70 ,, |

The silver salt in each case is boiled with the solution of the carbonate of ammonia until it is dissolved. Sulphate of silver is formed by adding a solution of sulphate of soda (Glouber's salt) to a solution of nitrate of silver, or by boiling silver with its weight of sulphuric acid.

For coating common German silver, Tuck adds half-an-ounce of sulphate of silver to a solution containing 107 grains of bicarbonate of ammonia.

To Remove Soft Solder from Gold and Silver Work.—The following method is given by Mr. A. Watt:—Place the soldered article in a hot solution of perchloride of iron—made by dissolving crocus or jewellers' rouge in muriatic acid—diluting the solution with four times its bulk of water, and there leaving it until the solder is removed. A formula recommended by Gee for this purpose is composed of protosulphate of iron (green copperas), 2 ozs.; nitrate of potassa (saltpetre), 1 oz.; water, 10 ozs. Reduce the protosulphate of iron and nitrate of potassa to a fine powder, then add these ingredients to the water and boil in a cast-iron saucepan for some time; allow the liquid to cool, when crystals will be formed; if any of the liquid should remain uncrystallised, pour it from the crystals and again evaporate and crystallise. The crystallised salt should be dissolved in muriatic acid in the proportion of 1 oz. of the salt to 8 of acid. Now take 1 oz. of this solution and add to it 4 ozs. of boiling water in a pipkin, keeping up the heat as before. In a short time the most obstinate cases of soft solder will be cleanly and entirely overcome and the solder removed without the work changing colour.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

8,995. W. A. Murray, London, for "Improvements in solitaires and studs." Dated June 24, 1887.

9,063. F. Nockold, London, for "An improved method of cutting diamonds and other precious stones." Dated June 25, 1887.

9,151. J. Robinson, London, for "A new or improved sliding stop for watches." Dated June 28, 1887.

9,264. J. G. Lorrain, London, for "Improvements in chronoscopes." Dated June 29, 1887.

9,287. H. Bush, Hull, for "Improvements in combination lamp and blow pipe for gasfitters, jewellers, &c. Dated June 30, 1887.

9,291. M. F. L. Ehrlich and C. T. Storck, Berlin, for "Improvements in a method of prodncing a bright printing gold, silver or platine." (Complete specification.) Dated June 30, 1887.

9,292. M. F. L. Ehrlich, Berlin, for "Improvements in the method of producing dead gold (silver, platine) decorations on china, crockery ware, glass, enamelled metals, &c." (Complete specification.) Dated June 30, 1887.

9,313. A. Mann, London, for "Improvements in alloys of aluminum with other metals." Dated June 30, 1887.

9,389. C. A. Burghardt and W. J. Turning, Manchester, for "Improvements in the production of aluminum." Dated July 2, 1887.

9,430. T. D. Harries, Aberystwith, for "A watch key." Dated July 4, 1887.

9,436. F. R. Baker, Birmingham, for "Improvements in sleeve links, solitaires and other like dress fasteners." Dated July 4, 1887.

9,550. F. Price, London, for "An improved fastener for attaching and detaching pencils, whistles, scent bottles and pendants to watch guards or chains." (Complete specification.) Dated July 6, 1887.

9,586. A. Mann, London, for "Obtaining aluminum and alloys of aluminum with other metals." Dated July 7, 1887.

9,681. A. N. Contarini, D. Forbes and R. Matthews, Loudon, for "A novel means and apparatus for the extraction of platinum from any ore containing same, and also gold from auriferous, ferruginous sand." Dated July 9, 1887.

## Recent American Patents.

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| Cuff Fastener. D. Stone ... ... ... ... ... ... | 364,143 |
| Earring Fastening. T. W. F. Smitten ... ... ... ... | 364,140 |
| Earring. H. Knickman ... ... ... ... ... ... | 364,179 |
| Jewellery, Mounting for. G. W. Ryan ... ... ... ... | 363,915 |
| Metal Drawing Machine. W. A. McCool ... ... ... ... | 364,126 |
| Watch. G. E. Hart ... ... ... ... ... ... ... | 364,105 |
| Watch Balances, Manufacture of. G. E. Hart ... ... ... | 364,107 |
| Watch Case. C. K. Giles ... ... ... ... ... ... | 363,817 |
| Watch Case Pendants, Manufacture of. G. E. Hart ... ... | 364,108 |
| Watch Dial. G. E. Hart ... ... ... ... ... ... | 364,109 |
| Watch Movement Plate. G. E. Hart ... ... ... ... | 364,110 |
| Watch, Stem Winding. G. E. Hart... ... ... ... 364,015— | 364,106 |
| Watches, Transparent Dial for. C. Humbert, fils ... ... | 363,959 |
| Eyeglasses. Ga Nun & Parsons ... ... ... ... ... | 364,340 |
| Quicksilver, Apparatns for Saving Floured. J. H. Rae ... | 364,372 |
| Watch Barrel. F. Parker ... ... ... ... ... ... | 364,370 |
| Watch Safety Guard. J. Lehr ... ... ... ... ... | 364,528 |
| Wheels, Mannfactnre of Metal. J. R. Little ... ... ... | 10,843 |
| Barometers, Rotary Indicator and Dial Scale for Aneroid. H. S. S. Watkin ... ... ... ... ... ... ... | 364,692 |
| Clocks, Street. A. Staib ... ... ... ... ... ... | 364,971 |
| Clocks, Electric, Synchronising Apparatus for. Ramel & Dean | 365,023 |
| Micrometer Guage. A. H. Emery ... ... ... ... ... | 364,193 |
| Watch. F. B. Von Wechmar ... ... ... ... ... ... | 365,032 |

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| Files, Making. C. M. Fairbanks ... ... ... ... ... | 365,249 |
| Spectacle Frame. J. L. Newell ... ... ... ... ... | 365,090 |
| Clock, Electric Alarm. M. Stecher ... ... .. ... ... | 365,493 |
| Cuff Holder. C. A. Howell ... ... ... ... ... ... | 365,685 |
| Cuff Holder. A. S. Pattison ... ... ... ... ... ... | 365,626 |
| Eyeglasses, Bow Spring for. J. F. White ... ... ... ... | 365,496 |
| File Cutting Machine. H. J. Gosling ... ... ... ... | 365,479 |
| Metal, Machine for Cutting. L. L. Hazen ... ... ... | 365,517 |
| Watch Regulator. C. E. Jones ... ... ... ... ... | 365,688 |
| Watch, Stem Winding. W. W. Hastings ... ... ... ... | 365,595 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, Imperial Buildings, Ludgate Circus, E.C.

## Gazette.

### PARTNERSHIPS DISSOLVED.

Tuck & Godfrey, St. James' Street, Clerkenwell, manufacturing jewellers. Briggs, Bennett & Newton, Sheffield, cutlery manufacturers. Waterfall & Habgood, Wimborne Minster, watchmakers. Allcard & Co., Sheffield, electro-plate manufacturers. Flavelle Brothers & Roberts, Ely Place, Holborn and elsewhere, jewellers. John Swain & Co., Bristol, watchmakers. Henry Nicholls & Co., Liverpool, wholesale jewellers. Gourdel, Vales & Co., Old Change, City, importers of French jewellery. Wertheim & Hirschhorn, Hatton Garden, goldsmiths. Collett & Co., Birmingham, wholesale jewellers. Farafay & Davey, Hatton Garden, jewellers.

### THE BANKRUPTCY ACT, 1883.

#### RECEIVING ORDERS.

*To surrender in London.*—Edwin Henry Watts, Carnaby Street, Regent Street, goldsmith.

*To surrender in the Country.*—John Sharpe (trading as J. Sharpe & Co.), Birmingham, wholesale jeweller. Robert James Dick, Birmingham, jeweller. Henry Nathan Owles, Ipswich, watchmaker. William Smith Wigg, Great Yarmouth, jeweller. John Jennings, Ewell Road, Surbiton, watchmaker. Samuel Hyam Weingold and Maurice Levy, Manchester, wholesale jewellers. Albert Chesterton, Nottingham, watchmaker. William Hayward, Christchurch, Hampshire, watchmaker. William Henry Stokes, Birmingham, manufacturing jeweller. Thomas Marson (trading as T. Marson & Co.), Birmingham, jeweller. Frederick George Baker, Shanklin, watchmaker.

#### RECEIVING ORDER RESCINDED.

W. H. Peake (trading as Grant & Peake), Gerrard Street, Soho, manufacturing jeweller; June 30.

#### PUBLIC EXAMINATIONS.

*In the Country.*—W. S. Wigg, Great Yarmouth, jeweller; August 15, at 11. J. Fletcher (trading as John Fletcher & Co.), Birmingham, jeweller, &c.; August 3, at 2. S. H. Weingold and M. Levy, importers of foreign fancy goods; August 10, at 11. W. Hayward, Christchurch, Hants., watchmaker; August 10, at 12. J. Jennings, The Pavement, Surbiton, watchmaker; October 14, at 3.30. A. Chesterton, Nottingham, watchmaker; August 9, at 10.

#### ADJUDICATIONS.

*In London.*—W. Van Walwyk, Clerkenwell Road, diamond mounter.

*In the Country.*—J. Sharpe (trading as J. Sharpe & Co.), Birmingham, wholesale jeweller. J. Joseph and M. Joseph (trading as J. Joseph & Sons, and as Scott & Co.), Birmingham and elsewhere, jewellers and merchants. J. Wragg (trading as J. Wragg & Son), Sheffield, spring knife manufacturer. W. S. Wigg, Great Yarmouth, jeweller. R. J. Dick, Birmingham, jeweller. S. H. Weingold and M. Levy, Manchester, wholesale jewellers. Rosina Ash, Birmingham, pawnbroker. A. Chesterton, Nottingham, watchmaker.

#### NOTICES OF DIVIDENDS.

*In London.*—C. Marx (trading as C. Marx & Co.), New Bond Street and Regent Street, jeweller; 1⅞d., second and final: July 25. W. Hurlbatt, 8, Old Jewry. G. E. Welsman, Fenchurch Street, metal merchant: 3½d., first and final: any day except Saturday, Chief Official Receiver, 33, Carey Street.

*In the Country.*—W. Ellison, Bradford, working jeweller; 3s. 4d., first and final; July 4. Official Receiver, Bradford. G. H. Smith (trading as G. H. Smith & Co.), Walton and Liverpool, pawnbroker; 6¼d., second and final: any day. T. T. Rogers & Co., Liverpool. T. Wheeler, Preston, watch manufacturer; 5s. 7½d., first and final; July 16, 5, Winckley Street, Preston. T. Prescott, Prescot, watch material dealer; 6d., first and final; July 19. Official Receiver, Liverpool. T. Harrison, South Stockton, pawnbroker; 3s. 10d., first; July 27, Official Receiver, Middlesbrough. A. J. Cotton, Great Yarmouth, silversmith; 4s. 2¾d., first and final; July 22, Official Receiver, Norwich. F. J. Braund, Banbury, jeweller; ¼d., first and final: July 21, 120, Colmore Row, Birmingham.

#### AMENDED NOTICE.

J. F. Bayfield (trading as J. F. Bayfield & Son), Lowestoft, watchmaker; 1s. 10¾d., first and final; January 31, 77, Colmore Row, Birmingham.

#### SCOTCH SEQUESTRATION.

N. A. Myers (trading as N. A. Myers & Son), Edinburgh, jeweller.

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

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## SPECIAL NOTICE.

**Our correspondents are kindly requested to note that the Office of this Journal has been removed to more commodious premises at No. 7, St. Paul's Churchyard.**

## CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to

THE WATCHMAKER, JEWELLER & SILVERSMITH,
7, ST. PAUL'S CHURCHYARD, LONDON, E.C.

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

THE Bill usually styled the Merchandise Marks Bill, but which, to give it its full title, should be called the Merchandise Marks Law Consolidation and Amendment Bill, has at length passed the Upper House and will have by the time this article appears in print received the Royal sanction: and it is not too much to say that the members of the watch trade especially are to be congratulated on the large share they have had in its induction, and the valuable additions since made to it which are the outcome of their suggestions.

In our previous comments on the Bill we animadverted somewhat strongly on certain clauses that rendered the measure as then contemplated generally inoperative, and unduly interfered with the principle of freedom of trade; and these, we are pleased to note, have been for the most part either omitted altogether or so far modified in the necessary direction as to make their retention comparatively unimportant. As it stands, the Bill, although by no means perfect, is likely to prove of immense benefit to English manufacturers in their competition in this country with foreign producers, and the replies of Sir Henry Holland and Lord Cross to the deputation from the Manchester Chamber of Commerce hold out hopes of its provisions being extended to the Colonies; as to foreign markets, nothing but private energy can prevent damage to English trade and reputation by fraud and misrepresentation. Meanwhile the gratitude of the whole trading community is due to Baron de Worms, Mr. Attorney-General and Mr. Stuart-Wortley for introducing it, and for their unremitting attention during its progress through Parliament. The Bill as passed errs more from faults of omission than commission. Its weak points, as it affects watchmakers, are the too general character of the clause referring to the place of origin of the movement, and the confusion and litigation the absence of any definition concerning the same may possibly give rise to.

With regard to the succeeding clause and paragraphs, minor exception might perhaps be taken to the method therein indicated

of making declarations as to the make of the case; but this is a matter of detail which the Council, after taking the opinion of officers of the Assay offices, may safely be trusted to arrange with the least amount of vexation to the casemaker.

The difficulty of drawing the line between what is allowable as a trade puff and what amounts to a fraudulent mis-description of goods was never more clearly manifested than throughout the course of the present Bill, and it says much for the sound judgment of those who have carried it through that they should have produced a measure which is as moderate in the one direction as it is workable in the other. There are, of course, various points of view to every question, and objections are now to be heard that the Bill is a manufacturers' Bill, and that the public require protection from the home manufacturer quite as much as the latter does from his foreign competitors. But, after all, legislation of this kind can only go a certain way, and an Act of Parliament that should undertake to deal with every species of fraudulent ingenuity would be both endless in its ramifications and of questionable utility in its results. Advertisers have a prescriptive right to indulge in descriptive flights of fancy, any attempt to check which would assuredly end in failure. In our opinion the Act, in dealing with trade marks, has gone as far as is within the scope of practical legislation; the further regulation of trade ethics can only be left to the common sense of purchasers.

## General Notes.

AS will be seen from the special notice on the first page, the address of this journal has been changed from Imperial Buildings, Ludgate Circus, to No. 7, St. Paul's Churchyard.

THE Mappin Art Gallery, which has been built at a cost of £15,000, and provided with pictures valued at about £50,000—a bequest to the town of Sheffield by the late Mr. John Newton Mappin—was opened on Friday, July 29. Sir Frederick Mappin, Bart., M.P., nephew of the donor, made the presentation, and a collection of paintings, valued at £20,000, given by himself, was presented on his behalf by Mr. Mundella. The Mayor, Sir Henry Stephenson, accepted the gifts on behalf of the Corporation.

THE Cutlers' Co. held their annual meeting at Sheffield on the 2nd ult., when Mr. James Dixon, of the well-known firm of Messrs. James Dixon & Sons, was nominated as Master for the ensuing year. Although Mr. Dixon is one of the youngest members of the Company, he is particularly well qualified for the office to which he has been called, having travelled extensively and being generally a well-informed and able man. His firm is the oldest and largest in the trade. The senior warden for the year is Mr. S. E. Howell, and the junior warden Mr. S. G. Richardson. The Cutlers' Feast is to take place on the first Thursday in September, when Mr. Dixon will be installed according to the quaint and picturesque ceremonial of this ancient corporation.

THE various Chambers of Commerce of the country have been informed by the Foreign Office that Mr. Frederick Witty, British Vice-Consul at Barcelona, a local commission agent and broker, is well qualified to supply information to persons who may wish to obtain particulars respecting the International Exhibition to be opened in that city next spring, and to act as agent for persons who may desire to avail themselves of this opportunity to bring their goods into public notice in Spain.

THE case of Short, Short & Deykin came before the Court of Bankruptcy on August 16, upon an application for the approval of a scheme of arrangement agreed to by the creditors at the first meeting. The debtors filed their petition on May 17 and furnished accounts showing joint liabilities £63,461 and assets £20,776. It was agreed that the property should vest in and be administered by Mr. A. O. Miles, accountant, as trustee, under the supervision of a committee of inspection. The executors and beneficiaries under the will of the late Mr. Thomas Short (creditors for nearly £20,000) also agreed to postpone their right to a dividend until the other creditors should have received 5s. in the pound, after which they were to receive 4s. 6d. in the pound; and the residue of the assets were to be distributed rateably among all the creditors. His Honour considered that the scheme was a beneficial one, and made an order for its approval.

A NEW Company, under the designation of the New South Wales Bingera Diamond Fields, Limited, has been formed to purchase and work diamond fields in the locality named. The capital is £90,000, in £1 shares, of which 30,000 are reserved as fully paid up in part payment to the vendor and 60,000 are offered for subscription. Mr. Sewill, of 30, Cornhill, states that his name has been inserted in the prospectus of the Company without his knowledge or consent, and that the statement that diamonds from the property that the Company has agreed to purchase are on view at his address is without foundation.

METALLIC alloys form the subject of four patents issued in the United States to Mr. Charles Auguste Paillard, of Geneva. The materials composing the alloys are palladium, copper, nickel, gold, platinum, silver, steel and iron, some of the alloys having only a few of these ingredients, and all of them being in varying proportions, with special methods for their combination. The object sought by this invention is to make metallic alloys especially adapted for different parts of clock, chronometer and fine watch work, which shall be neither oxidisable nor magnetic, with small capabilities of dilatation, and having hardness and elasticity and more or less of the properties of steel, according to the particular use to which the alloy is to be put, and the grade of watch, clock or chronometer to be made therewith.

THE Emperor William's Jubilee gift to the Pope is a magnificent gold mitre, profusely studded with diamonds, rubies and emeralds.

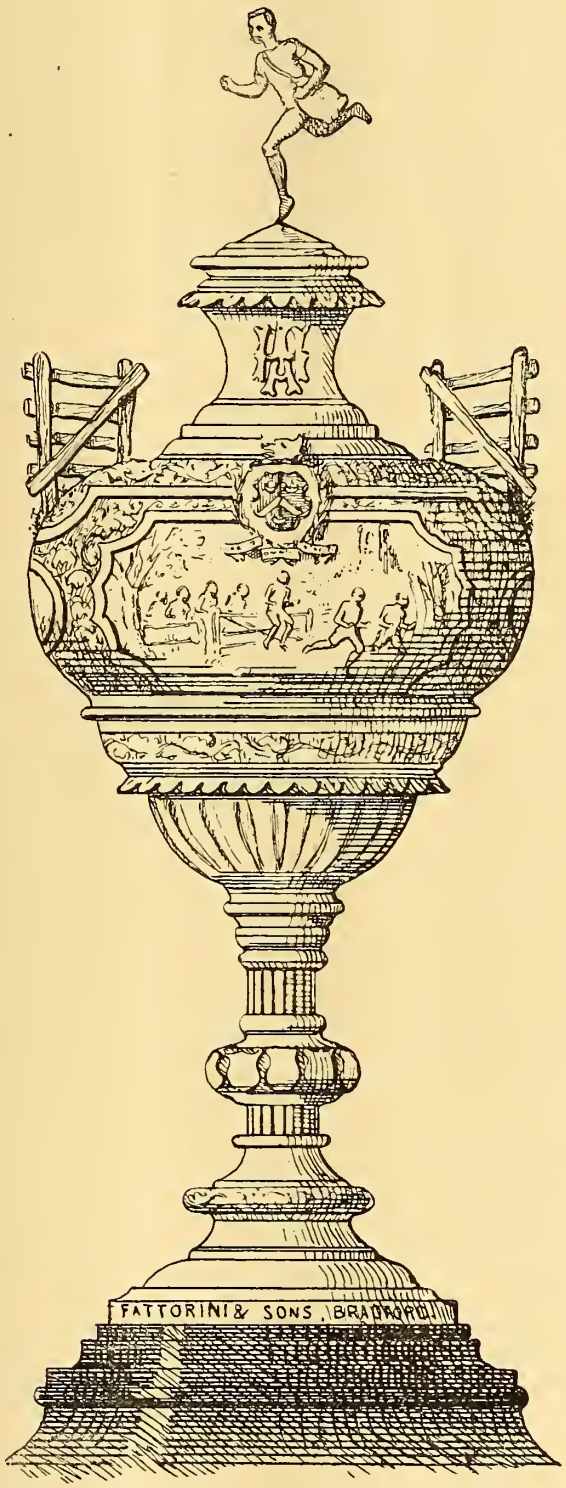
TECHNICAL EDUCATION.—In the House of Commons, on August 16, Sir W. Hart Dyke, questioned by Mr. Howard Vincent and Mr. Stanley Leighton, said it was intended to give freedom to localities, on the sanction of the Science and Art Department, in respect of technical instruction. Grants were not made at present for manual instruction in the use of tools.

BRUSSELS EXHIBITION OF SCIENCE AND INDUSTRY, 1888.—The Executive Committee of this Exhibition are offering prizes for designs for bills, diplomas and medals to be used by the Committee, also for designs for small buildings to be erected in the Exhibition gardens, and for a method of constructing and arranging the water closets, &c., in the Exhibition. The Secretary of the Society of Arts has received a supply of the conditions for the various competitions, and these he will be happy to send to any person requiring further information.

THE ruby was called by the Greeks *anthrax*, or live coal, from its brilliant blood-red colour and exquisite beauty, which, like the diamond, is rather improved than diminished when seen by artificial light. From the intense blaze of blood-red, the colours of the ruby pale down, by admixtures of blue, through rose-red to lilac. Exposed to the rays of the sun, or heated, the ruby, like the diamond, becomes phosphoric. In the Middle Ages it was supposed to be an antidote to poison, and to warn its owner of misfortune by a darkening of its colour until the danger was past.

## Trade Notes.

The Airedale Harriers' Championship Cup.—The cup we illustrate below is a handsome massive vessel of solid silver, 60 ozs. in weight, standing 19 in. high, and valued at £40. Poised on the top of the cover is the representation of a fleet "hare" dashing along with his bag of "trail." Below, an elegant monogram is made of the letters A. H., intertwined, this being on the neck of the cup, which is beautifully chased and ornamented. Below again, on the body of the cup, the Bradford arms with crest and motto appear. The handles are appropriately formed of five-barred gates. A large elongated panel stretches across the front of the vessel, and on this is engraved a pack of "hounds" in full cry; two swift runners are in advance scudding along at full speed, a third leaps a fence, and the remainder are hurrying up in the rear. A wooded landscape, in which the old ruined tower of Kirkstall Abbey is a conspicuous object, forms the background. A similar panel adorns the back of the cup, on which is engraved the following inscription, "The Airedale Harriers' Championship Cup, Three Miles Steeplechase, Bradford, Yorkshire, 1887." These panels are surrounded by richly chased arabesques, whilst bands of floral ornaments complete the decorations. The stem on which the cup stands is formed of a chased fluted column, bearing round it a bulky ring of finely embossed shields making provision for inscribing names of winners, further accommodation for the same object being made beneath each handle. A broad richly-decorated foot completes the whole, which, whilst being solid and compact in appearance, is also singularly free and graceful in effect. It is a piece of silverware of which the Airedale Harriers and such fortunate ones as may become its holders may be deservedly proud. It is the workmanship and design of Messrs. Fattorini & Sons, of Bradford.




Mr. John Jefferys, the well-known specialist for solitaires and studs, has just introduced what he calls his "Omega." This is a one-piece eccentric round-back solitaire, having all the advantages of the popular "Bi-Climax." The eccentric movement of the shank is effected by the ingenious and simple arrangement of turning the top, the perfect action of which is ensured by the manufacturers, Messrs. Hammond, Turner & Sons, and Messrs. Perry & Co., Limited, both of Birmingham, before it leaves their works. This novelty, which is likely to become a public favourite, is made in a variety of designs, and can be obtained of the wholesale and fancy goods warehouses generally. It is patented in America, Germany and elsewhere abroad.

In the window of the Moorgate Street showrooms of Messrs. Elkington & Co. is now to be seen an elaborate specimen of the silversmiths' art manufactured by them, which is to be presented by the Hop Bitters Co. to the National Rifle Association for annual competition. The base of the trophy is of an octagonal form with two projecting divisions, having semi-circular ends, each end supporting a figure, one representing Hygeia and the other Panacea, the daughters of Æsculapius, each figure accompanied by their classic attributes, viz., the staff, serpent, globe, cup, &c. The base is further beautifully decorated and enriched with mouldings of a Grecian character, and at regular intervals are depicted four shields, bearing the national emblems in enamel of England, Ireland, Scotland and Wales. A running frieze of the hop plant, elaborately embossed, chased and pierced, decorates the whole of the exterior of the base, whilst prominently placed in the centre is an enriched shield with the symbols of Æsculapius and Mars, and a conventional arrangement of the sun's rays indicative of curative powers. Rising majestically from the base is a second platform of a circular form bearing on one side a group illustrating the various volunteer corps in the United Kingdom, and on the opposite side a handsome shield for inscription, and on the other two shields facing the ends of the trophy are bas reliefs with representative groups of military and medical appliances. Between these bas reliefs are suspended wreaths of hops, &c. Above the bas reliefs are four emblematical figures of the nationalities supporting shields enamelled with the insignia of their patron saints. From the centre rises a canopy or temple enclosing a magnificently modelled statuette of Æsculapius, the temple being enriched and supported by four pillars elaborately decorated with the hop plant, flags, wreaths, &c. The base of the temple is in the form of a square, and is embellished with four scenes of important events in the reign of Queen Victoria, viz., the Coronation, the opening of the 1851 Exhibition, the inauguration of the Volunteer Camp at Wimbledon, and the proclamation of the Queen as Empress of India. The whole is surmounted by a winged figure carrying an escutcheon with the well-known green hop cluster and words "Hop Bitters," the former enamelled in green and the latter in black, exactly as appears on the labels of the Company's bottles. The trophy weighs upwards of 2,000 ozs., and is of the value of 1,000 guineas.

A new patent safety catch for brooches, the invention of Mr. W. T. Braham, of 392, Stratford Road, Manchester, supplies such a universal want and is of such obvious utility, that the wonder is it has never been thought of before. The innumerable

cases in which valuable artieles of jewellery fastened with the conventional pin have been lost, owing to the insecurity of this mode of attachment would, one would think, have stimulated enterprise in this direction, but, as far as we are aware of, nothing of the kind has ever been attempted before. The device under notice consists of a small spring which comes against the eatch, and while allowing of the pin entering freely, effectually prevents it from becoming unfastened until released by the wearer, which ean readily be effected. Its further recommendations are its extreme simplicity and the fact that it can be applied to any kind or form of brooch.

THE new alloy which is placed on the market under the name "Afghan silver," and the registered trade mark C. T. & S., is experiencing a ready sale, and the manufacturers now find it necessary to issue a cireular to the trade in which jewellers are cautioned against the number of spurious imitations which are put forward as "Afghan silver," but which are in most eases either brass or German silver thinly plated with niekel. The "Afghan silver" on the other hand is an alloy, whieh, while always retaining its brightness in wear, is of the same whiteness throughout, and has without doubt a future before it, being well adapted for many uses besides those to which it is at present applied, which have hitherto been confined to articles of jewellery for personal wear. As the manufacturers elaim to be able to produce it as cheaply as German silver can be obtained, it should quiekly supersede the latter as soon as its merits become generally appreciated.

WE have received from the designers, Messrs. Mitchell & Cooper, of Nørthampton Street, Clerkenwell, a specimen sheet of their "Designs for Engraving," which is just published. The work, which must have cost the authors much time and trouble, will supply a want long felt by engravers and others, to whom a variety of well-exeeuted and original designs is a *desideratum;* and as the book, to judge from the sheet before us, fulfils this condition—eomprising all kinds of armorial bearings, monograms, eiphers, club and hotel badges, &c.—and its price (2s. 6d.) brings it within the reach of all, it should quiekly reach a seeond edition.

THE DIAMOND MARKET.—The *Amsterdam* trade has been very quiet during the past month, although the factories are reported to be fully occupied with work, and several are increasing their premises.

The continued dulness is not likely to last mueh longer, and is not of much moment, as this time of year is always the slack season. No change is expected, however, until after the great Russian fair of Nishni-Novgorod, which, if successful, usually brings in large numbers of Polish and Russian buyers to replenish their stocks.

Complaints are still the rule as to the high price of *rough*, and hopes are expressed that the amalgamation going on among the different eompanies at Kimberley may result in easier priees.

*Paris* trade in finished goods is very quiet. This being the summer vacation, most of the speculative merchants are still holiday making, and the prices obtainable are in consequenee low through want of competition. A few foreign buyers are purchasing small parcels, but the local demand is insignificant.

The steamers "Garth Castle," "Trojan," "Roslin Castle," "Spartan" and "Warwiek Castle" arrived at Plymouth bringing plentiful consignments, which generally went off well, numerous foreign buyers being in the market. The best business was done for the American account.

Latest advices from *Kimberley* report the market as continuing very firm, as although the official returns show an increased production in eomparison with those for the eorresponding period of last year, shippers are generally complaining of scarcity of stuff.

The De Beers Co. are going to buy out the French Diamond Mining Co. for about £950,000, giving the option to the French shareholders to take payment in eash or in shares of the De Beers Co., a new issue of which will, if necessary, be ereated for the purpose. Messrs. N. M. Rothschild & Sons are at the head of the syndieate which is at the head of this business.

According to Mr. Crump, of the *Times* "City artiele," the value of raw diamonds exported annually from Kimberley is considerably over three millions sterling, and so far this enormous output has not depressed the diamond market, as the consumption has increased considerably.

SILVER.—The market has continued most unusually steady throughout the month, showing increased strength after the Indian Council allotments on the 24th. Latest quotations are bars 44$\frac{13}{16}$d., Mexican dollars 43$\frac{11}{16}$d. per oz.

## London Watch Trade Association.

THE monthly meeting of members of the London Watch Trade Association was held on August 3, at the Martyrs' Memorial Church Schoolroom, St. John Street Road, Clerkenwell. There was a numerous attendance, Mr. S. A. Brooks in the chair.

Mr. NEWMAN, the secretary, read the minutes of the previous meeting.

The CHAIRMAN said he had told them at the last meeting he hoped he should be able, at this meeting, to congratulate them on the final success of the Merchandise Marks Bill. He was sorry he could not do that, but he had ascertained from their president, Captain Penton, that the final reading in the House of Commons of the Lords' amendments would take place on Thursday evening, so his promise was very near fulfilment. They had not long to wait for the law which he hoped would help to restore to Clerkenwell her staple trade. The elauses of the Bill would not permit foreign work being sold in an English Hall-marked case, unless the vendor specified in writing the foreign works to the vendee at the time of the purehase. Negleet of this would render the vendor liable to a charge of fraud any time within three years of the sale. It would be well for manufacturers to face the position at once, and determine on using only English material and English work in their manufacture, if they desired the English Hall-mark in the case. Of course, if they eould sell their watches with the foreign or distinctive mark, they eould continue to make a bastard watch; but all agree that the English watch, pure and simple, is still the favourite timekeeper, and for a sound, knockabout, useful timekeeper, none excel the full-plate, capped and jewelled watch: it is less expensive to wear, because stronger, and less liable to get out of repair. Sinee the last meeting the secretary had been in eorrespondence with associations at Birmingham, Coventry, Liverpool and Prescot. Every amendment of the Bill had been watched by the eommittees, and the interests of the wateh trade cared for. He (the chairman) was sorry to see that the Horological Institute had rejected Mr. Chapman and placed Mr. Glasgow at the bottom of the list of viee-presidents. As one of the founders of the Institute, he felt the old love, and was sorry to see the ingratitude exhibited towards men who had rendered some serviee to the Institute. He had not always agreed with the gentlemen named; he did not think the Institute had done for the English watch trade what it might have done. The success of the London Watch Trade Association was a proof it had not. Still the eouncil were not wholly to blame; they had to consider their subscribers, many of whom were interested in upholding the foreign watch, and this was the stumbling-bloek in the way of those who desired that the Institute, originally founded as the British Horological Institute, should represent English interests. The London Watch Trade Association had avoided the error of the Institute. No man was eligible for membership in the Association unless born under the British flag; nor unless a manufacturer, or engaged in some branch of watch or cloek manufacture. They were no longer taunted with disunion. Their interests being identical, they were all agreed, and he believed there was a great future for the society.

Mr. ANDREWS enjoined upon all present to advocate the interests of the London Wateh Trade Association, and add to the already large list of members.

Votes of thanks to the chairman and seeretary elosed the proceedings.

## The Merchandise Marks Bill.

THE above Bill passed the House of Lords and received the Royal Assent last month. The second reading of the measure was agreed to in the House of Lords without a division; but, when the House went into Committee, Lord Stanley of Preston, who had a number of amendments on the paper, said that the purport of the Government amendments was this—it had been found that selling goods with fraudulent marks had been placed amongst those offences which were obviously committed with intent to defraud, while a man might sell goods marked with forged trade marks quite innocently. The proposal now was to take out the first part of the clause and make a separate matter of it. On Clause 2 several amendments would be proposed, and he would move the omission of the words referring to the sale of articles marked with forged or fraudulent trade marks. These were agreed to.

Lord Stanley of Preston next moved to insert, as a separate paragraph in Clause 2, these words:—

(2.) Every person who sells or exposes for or has in his possession for sale or for any purpose of trade or manufacture any goods or things to which any forged trade mark or false trade description is applied, or to which any trade mark or mark so nearly resembling a trade mark as to be calculated to deceive is falsely applied, as the case may be, shall—unless he proves (*a*) that, having taken all reasonable precautions against committing an offence against this Act he had at the time of the commission of the alleged offence no reason to suspect the genuineness of the trade mark or trade description; and (*b*) that on demand made by or on behalf of the prosecutor he gave all the information in his power with respect to the persons from whom he obtained such goods; or (*c*) that otherwise he had acted innocently—be guilty of an offence against this Act.

This was agreed to.

Lord Macnaghten moved to insert in Clause 3 the following new paragraph:—

The provisions of this Act respecting the application of a false trade description to goods shall extend to the application to goods of any such figures, words or marks, or arrangement or combination thereof, whether including a trade mark or not, as are reasonably calculated to lead persons to believe that the goods are the manufacture or merchandise of some person other than the person whose manufacture or merchandise they really are.

This was agreed to, and Clauses 2, 3 and 4, as amended, were agreed to.

After some further verbal amendments the Bill passed through Committee, and on Tuesday, the 2nd ult., the Bill was read a third time and passed.

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Fraudulent Marking of Goods.—A deputation from the Manchester Chamber of Commerce waited upon Lord Cross on Thursday, the 4th ult., at the India Office, to urge the necessity before the present Merchandise Marks Act Consolidation and Amendment Bill, now before the Lords, should come into force, of extending its provisions to India. Lord Cross said he entirely agreed in the views placed before him, and he had anticipated the views of the deputation to a great extent by writing a strong despatch to the Viceroy, pointing out the difficulties of the whole matter, and inviting the Government of India to consider the expediency of early legislation upon this point. The moment the Bill passed the House of Lords in its final shape it would be sent to India for consideration. He should be glad to do all he could to stop falsification. Subsequently the deputation proceeded to the Colonial Office to ask Sir H. Holland to urge upon the Colonial Parliaments the advisableness of passing a similar measure to that which is now before the House of Lords. Sir H. Holland promised that as soon as the Bill passed he would send a circular to all the Crown Colonies asking them to take such measures as may be necessary to give full effect to the Act.

## Birmingham News.

From Our Correspondent.

THE Birmingham metal work at the Art Gallery, which has been purchased with the balance from the Exhibition funds, is the most unfortunate selection that could have been made, and has caused an enormous amount of dissatisfaction, and not without cause. The jewellery part of it is, with few exceptions, especially weak, and, instead of raising the fame of the Birmingham jewellers, it will actually tend to decrease it. Who is responsible for this I am not in a position to say; but I will guarantee that if any jeweller's apprentice, who is also a student at the School of Art, had been called in as judge, that he would have made a more artistic selection. The whole of the articles, with the exception of a brooch with a damascened centre, are below criticism as art work. This is certainly "a little more than kin and less than kind" that the "little hardware village" which has fought its way bravely to the front, and has succeeded in producing artistic works in metal in which she is unrivalled, should be "sat upon" by the bungling of a few gentlemen who thought they were judges of art, and who have exhibited their own ignorance and done a great injury to the fame of the town by their injudicious selections.

* * *

Solitaires, especially the various spring arrangements, still keep in fair demand, and they are the only "steady line" that I know of. General jewellery is worse than bad, and that Art Gallery exhibit will not "help the lame dog over the stile." The almost daily failures of wholesale houses are shaking some of the manufacturers seriously, and a rush out of the trade has already commenced—a large stock of a manufacturer being brought to the hammer this week, which realised miserable prices. Well, during this "panic," so to speak, the weak are going to the wall in the natural course of things; history repeats itself, and this is not the first time this state of things has happened in the jewellery trade, and it will not be the last until the unlimited credit, approval, and accommodation bill system has been exterminated root and branch. In the meantime, those strong birds who can keep at the top must thank God and pay their debts.

* * *

I suppose the trade, from what I hear, is going to accept a dividend of 12s. in the pound from a large wholesale house who held a private meeting last week, instead of investigating affairs and letting daylight into the otherwise obscure and curious balance sheet submitted. Well, all I can say is, they must not be surprised if they are called upon to accept a few more dividends if they will be weak and disunited.

* * *

As manufacturers are running short time and short handed, the question is often asked, what has become of the workpeople? I find a great number have gone abroad—some of them finding good situations as jewellers, others taking any work they can get. One of the shipping agents has booked over 300 jewellers to America this year from Birmingham alone.

* * *

I hear some complaints from Canadian buyers that they come year after year to England to replenish their stock, and that manufacturers show them the same or similar patterns. This may, of course, apply to a few, but, generally speaking, makers leave nothing unturned in order to produce novelties; and it is to be regretted that this rage for novelties has acted against the production of really artistic work—for if makers find that an idiotic arrangement of a tennis net with a hat soldered in the middle will sell, while a good piece of wrought and decorated work will remain in stock, they are almost compelled to produce the saleable one: but please to give the blame to the right persons, namely, the public, and not the makers. A good deal of this could be remedied if the factors had a better and more artistic education. They all have a good knowledge of what will sell, but as a rule their ideas of art are *nil;* and I could give numerous instances where an artistic and enthusiastic

maker has been quite discouraged by the sareastic critieism of an ignorant buyer. I ean vouch for the truth of the following:—A maker was showing a Jew faetor some very high elass work of the Pompeian style, and recommended it to him as Pompeian art work. "Vat!" said the Jew; "Vat! Oh, pump on de Devil." The maker "took a back seat" and sold the Jew some of his most atrocious "novelties," whieh were more to his taste. Well, in spite of this, we must not ery "Ichabod," but the publie must be educated up to a better standard. No doubt this is being gradually done, and the wholesale houses might help to do it; but that unfortunate Art Gallery exhibit will eertainly retard it.

## American Items.

THE eounsel for a trade organisation of workmen reeently sent a letter to the American Waltham Wateh Co., in which he protested against the importation by the Company of alien workmen under eontract, and further stated that, if the praetice was continued, the association would proseeute. A representative of the *Jewelers' Weekly* waited upon Major F. R. Appleton, of Robbins & Appleton, agents for the Company in New York eity, to inquire into the truth of the story. The major said that he had reeeived the letter referred to, and that in it the Company had been aeeused of importing alien workmen in direet violation of the law. "All I have to say," eontinued Major Appleton, "is that we are innocent of the charge, and that I should be pleased to be waited upon by representatives of the assoeiation which aecuses us." "Have you recently hired aliens to work in your faetories?" asked the seribe. "Yes. You see there is a seareity of good engravers in this country, and as a good many foreign experts are coming here, they find plenty of employment. It was some of these men who eame to us and asked for work, and we gave it to them. We did not go to the other side, nor was a representative sent to make *contracts* with the men. They eame here without solieitation, and seattered over the eountry looking for work. Some eame to us and we hired them. That's all there is in the matter."

THE Providenee eorrespondent of the same journal says:—Thus far the season has been more profitable to the manufacturer than any for several years past, and at present the demand for plated goods by the jobbers throughout the South and West is very large, and the outlook for fall trade is excellent. Shops are running full time and with all the hands that ean be hired, while in some of the faetories the help is required to work until 9 and 10 o'eloek in the evening five days of the week. Advertisements for help are appearing daily in the local papers.

THE San Franeiseo eorrespondent of the *Jewelers' Weekly* writes:—"A reaetion in the diamond market seems to have set in on the Paeifie Coast," said a leading diamond merehant to your eorrespondent, "and it is much better than it has been for five years past. These goods were at a diseount here several years ago, but of late they have beeome very saleable. The gem most in demand now is the ruby. It is greatly sought after and its popularity seems to be on the increase. Pearls are not in large demand on this eoast. The European capitals seem to be the great centres for them. The demand for sapphires and emeralds is about the same; but while opals were until very recently a drug in the market, they are now largely looked for and eommand good prices."

THE *Jewelry News* says the Ameriean watch factories are produeing so few key-winding movements that large dealers have resorted to the importation of Swiss key winders. Notably among these are Messrs. Henry Ginnel & Co., who are showing the trade a Swiss key winder, bearing the trade mark of "Newport," whieh has jumped at onee into publie favour, if their orders for them are indications of their popularity.

PROBABLY the most productive industry in the jewellery line in this State is the manufaeture of California quartz jewellery. This finds its best market among Eastern tourists, who not only prize it as a souvenir, but for its novelty. The work of the manufacturing jewellers of San Francisco in this line is not to be exeelled, as all who visit their establishments ean attest.

A COSTLY DIAMOND NECKLACE.—Aceording to *Harper's Weekly*, the costliest necklaee of diamonds ever owned in America was worn by the late Mrs. Mary Jane Morgan. She had a real passion for diamonds, and wore them in hairpins, brooehes, bracelets and rings as well: but her speeial pet was a necklaee, a *rivière* of diamonds, whieh cost her originally perhaps £7,000, and to whieh she has made various additions until its total value was £50,000. One day she astonished a elerk at Tiffany's by buying a diamond for £12,000 and ordering it to be set in her *rivière* as the eentre stone. Diamonds that onee glistened in her brooches, hairpins or braeelets were transferred to this necklaee, and diamonds that no longer pleased her in the necklaee were reset in the brooches, hairpins or braeelets. To her it was a perpetual pleasure to see the magnifieent neeklaee increasing its magnifieence. When she died the largest of the stones were sold singly; but the neeklaee without them was so valuable that Messrs. Tiffany bought it for £15,000. Soon afterwards they broke it up, and for many months it has eeased to exist.

## A Relic of Old London.

MR. J. W. BENSON, of Ludgate Hill, has just finished the repair of a very interesting cloek. When old St. Dunstan's, Fleet Street, was pulled down, in 1831, the cloek was sold by public auetion to the late Marquis of Hertford, who had it re-ereeted in the grounds of his villa in Regent's Park, a residenee designed by Decimus Burton. By the courtesy of Mr. Benson we are enabled to give the following particulars of this interesting relie of Old London:—The eloek frame is of the aneient bedstead pattern, all the wheels in each train being fixed in perpendicular bars, so that if it is neeessary to remove any part for cleaning or repair, the whole train must be taken to pieees. The eseapement is a dead-beat with a slight reeoil, the pallet arms being differently arranged to the modern style, one is at top and the other is at the side of the seape wheel. The cloek has a loeking-plate with "ting-tang" quarters, the hammers being raised from pins on the main wheels.

The peeuliarity of the eloek is, that instead of striking with hammers in the usual manner, two automaton giants, armed with clubs, deliver the blows alternately on the bells; and the whole apparatus was exposed to the view of an admiring public, and used to be one of the sights of London to country visitors. The pendulum beats $1\frac{1}{4}$ seconds, the whole of the wheels are brass, the barrels are very large to earry hemp ropes, the movement is above the dials, and there is a lead down to a pair of bevelled wheels and a further lead to two copper dials, six feet in diameter, fitted with a drum, whieh is supported by a massive oak beam and brackets.

In the grounds of the modern villa the old eloek appears preeisely as it did in the City, and the giants still go through their performances. Although the eloek is over 200 years old it goes well now and keeps good time; no maker's name appears on the movement. The present repairs are new brass bushes throughout, new fans and springs to striking fly, repairs to bevel and motion work, the entire movement being taken to pieees, thoroughly cleaned, the brasswork re-laequered and the iron painted.

Considerable interest is attached to this clock; Cowper refers to it in his "Table Talk" in lines that are eertainly eomplimentary:—

> "When Labour and when Dulness, elub in hand,
> Like the two figures at St. Dunstan's stand,
> Beating alternately, in measured time,
> The cloekwork tintinnabulum of rhyme,
> Exaet and regular sounds will be;
> But sueh mere quarter-strokes are not for me."

It may be remembered that Mr. Frith, R.A., in last year's Exhibition at the Academy, introduced the old clock in his picture, "Dr. Johnson's Tardy Gallantry."

The ancient timepiece now belongs to a private gentleman, for whom it has been faithfully restored on the original model, no alteration of any kind being made.

The following further particulars of this clock are from Wood's "Curiosities of Clocks and Watches:"—

This remarkable clock, that projected over the street in the manner of those of several of the City churches at the present time, was set up in the year 1671. Thomas Harrys, or Harris, received for his work the sum of £35, and the old clock. It appears, from the parish books, that on May 18, 1671, Thomas Harrys, who was then living at the lower end of Water Lane, London, made an offer to build a new clock with chimes, and to erect two figures of men with poleaxes to strike the quarters. This clock was so constructed as to afford one dial plate at the south front and another at the east end of the church. All this he proposed to perform, and to keep the whole in constant repair for the sum of £80 and the old clock; at the same time observing that his work should be worth a hundred pounds. He further adds these words: "I will do one thing more which London shall not show the like; I will make two hands show the hours and minutes without the church, upon a double dial, which will be worth your observation, and to my credit." It appears that the vestry agreed to give to Harrys the sum of £35 and the old clock for as much of his plan as they thought proper to adopt; and on October 28, in the same year, 1671, his task being completed, he was voted the sum of £4 per annum to keep it in repair. We find that the idea of chimes was given up, as well as the dials at the east end. Originally, in 1737, this clock, with its large gilt dial, was within a square, ornamented case, with a semi-circular pediment, and the tube from the church to the dial was supported by a carved figure of Time, with expanded wings, as a bracket. In 1738 it cost the parish £110 for repairs. Above it, in an alcove and in a standing posture, were two life-sized wooden figures of "savages or Hercules," as Strype describes them, or "two wooden horologists," as Ned Ward calls them, with clubs in their right hands, who struck the quarters of every hour on the two suspended bells, moving their heads at the same time. These figures much excited the interest of the passers-by, especially provincial visitors to London, who would stop in crowds to see these automata strike the quarters with their clubs. Leigh, in his "New Picture of London," calls them the "pets of cockneys and countrymen." They were one of the sights of London, and many a gazer at them has unwittingly enriched the pickpockets and cutpurses who used to mix with the crowd of gaping idlers assembled under this clock, to the no small obstruction of the foot and carriage-way. One historian tells us that they were "more admired by many of the populace on Sundays than the most eloquent preacher from the pulpit within." A writer in the *Mirror*, 1828, says, "It would be needless to describe the two brazen striking Saracens who attract the gaping multitude; when they perform operations one would really suppose they were in league with the pickpockets, who are below striking into the pockets of their admirers *sans cérémonie*." The author of "London Scenes and London People," an eye-witness of the old clock, says, "The giants stood in front of the building, about 30 feet from the road, on a covered platform, each wielding a club—the bell being hung between them, which at the quarters, as well as whole hours, they struck, but so indolently, that spectators often complained that they were not well up to their work. The mechanism, too, was rough and clumsy; you could not help noticing the metal cord inserted in the club, to which its motion was due." Sir Walter Scott speaks of the savages in his "Fortunes of Nigel;" but he places them in position before they were known to the gaping cockneys. When the old church was pulled down the clock and figures were purchased by the Marquis of Hertford and removed to his villa in Regent's Park, where the clubbers still do their duty every quarter of an hour. We read, under date October 22, 1830, "Mr. Creaton, auctioneer, sold by private contract to the Marquis of Hertford the clock-tower, with its two figures, for £210."

## Local and Universal Time.

*From the German by* Herman Bush.

In an interesting and lengthy article on "Chronology and Calendar," just finished in the *Allgemeines Journal der Uhrmacherkunst*, the author concludes with the following sentences:—

The earth rotates, within 24 hours, on its axis from west to east; it exposes every part of the globe during the diurnal culmination to the rays of the sun, and has all places situated on the line between north and south so exposed at noon or midday, generally called the geographical meridian.

The circumference of the earth in the centre between north and south, called the equator, is, like every other circle, divided into 360 degrees; and every one of these degrees passes the sun once in 24 hours and remains exposed the 360th part of 24 times 60 minutes = 1,440, or an equivalent of 4 minutes. When, for example, it is noon or midday at Greenwich, the next degree eastwards has had noon 4 minutes previously, whilst the next degree westwards will have noon 4 minutes later; and at the 180th degree from Greenwich eastwards and westwards, the 4 minutes for each degree will accumulate to 12 hours. The Antipodes will have midnight when the meridian of Greenwich indicates midday, and *vice versâ;* and the same phenomenon will manifest itself at any opposite degrees of the globe. We have, therefore, midday and midnight, and all intermediate parts of day and night, simultaneously represented on the face of the globe, and this variation of time at each place is called local time.

The different local times cause, in the continually increasing international intercourse, many drawbacks and confusions for defining the time of the day and even the date of the month between the despatch and arrival of telegrams to or from distant places, or for establishing a uniform time table for railway traffic in countries of extensive territory. This existing and unalterable state of confusion has induced the Governments and astronomers of civilised nations to establish an antidote, for the object of which International Conferences were held at Rome and Washington, where the subject was ably discussed by the delegates, who recommended the adoption of a universal time for the whole of the civilised globe, by establishing the prime meridian at Greenwich to start the world's time and cosmopolitan date; and, in order to effect this, it was suggested and unanimously accepted, to abandon the twice twelve hour calculation of time for the day and night, and substitute a 24 hours' system for the world's time.

The notation of local time may still remain for local use until the inhabitants of the various parts of the globe get properly accustomed to the comparing of the two notations, when all obstacles will be removed for universally adopting one time for the whole of the earth.

The middle of the vertical spider threads in the tube of the transit instrument at the Royal Observatory, Greenwich, indicating and representing the plane of the renowned prime meridian, which forms the guide for calculating distances east or west from Greenwich to nautical and seafaring men, by converting the difference of local time at sea with the Greenwich time of the marine chronometer on board into space, would, by the establishment of universal time, assume a higher importance, as the transit of noon before these fine threads would form the base for the calculation of universal time.

The astronomical regulator at the Royal Observatory, Greenwich, which commands in England the dropping of the time-balls for transmitting Greenwich time—the adopted time standard—would, in another direction, mediate an international unity by initiating the elevated promotion of the lofty realisation of universal time, and pave the way for the adoption of universal money, universal weights and measures, and universal language, thereby affording to the human aspiration for universality the means of celebrating an international triumphal feast.

## An Improved Trial Frame.

THE accompanying illustrations show a new trial frame for the use of oculists and opticians that has several points of excellence not found in others. It is the invention of the Geneva Optical Co., of New York. Fig. 1 is a front view, fig. 2 a side or sectional view. The steel rods *P P P P* are fastened rigidly in the metal block *M* and make the backbone of the frame. The screw *B B* governs the distance between the temples and the lens holder, carrying them towards or away from the centre by the right and left-hand thread. The nose rest is faced with shell and is easy to the wearer, and has an up and down and in and out motion, and can be placed in any desired position with reference to the lenses. The lenses can be adjusted to the pupillary distance quickly. The lens holders *K K* are attached to steel shanks *I I* which pass up into tubes *H H*, and

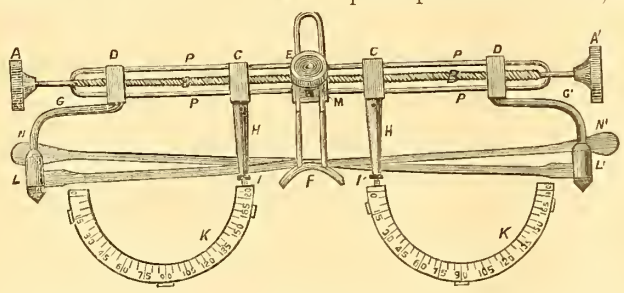


FIG. 1.

are held there by cap, nut and spring, but free to rotate on their axis as shown in fig. 2.

The cumbersome rotation rings are omitted, and the operator finds the method of holding the lenses is practically easier to manipulate than with the concentric rings. The principal points of superiority are that it is but about half the weight of the Nachet or other ordinary frame. It is made of steel where possible, and is therefore more rigid and durable. It allows three lenses for either eye, or, after a combination of spherical and cylindrical is made, it allows that they may remain in position

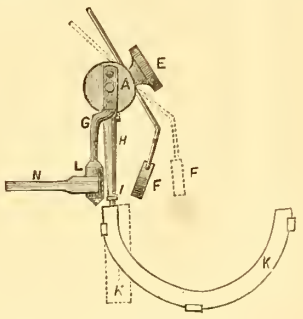


FIG. 2.

while testing the other eye, a solid disc being placed with them to shut off vision.

The frame does not have to be taken from the face to exchange the lenses or to test improvements made by the lenses, as either eye can, by a touch, be swung on its shank outwards. This frame allows the lenses to be brought about half-an-inch nearer together to get pupillary distance on children or narrow-faced people than any other, a point frequently of great value.

The nose rest is much easier than any other as it is faced with shell. The vertical adjustment to nose rest is excellent, and the horizontal movement in and out to throw lenses away from or towards the eyes is a great improvement.

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JUBILEE CLOCK TOWER AT BASINGSTOKE.—The ceremony of unveiling the new clock tower, presented to the town as a Jubilee memorial by the Mayor (Major May), was performed on July 28 by the Hon. Diana Sclater-Booth. The ancient clock, nearly a century-and-a-half old, has been thoroughly restored by Benson, of Ludgate Hill, the dials enlarged from 4 ft. diameter to 5 ft. 9 in., and a new train of wheels and two bells added, to chime the four quarters. Numerous visitors, besides the Town Council, were afterwards entertained at luncheon by the Mayor.

## The Burmah Ruby Mines.

THE correspondence on the subject of the Ruby Mines in Burmah was published on the 16th ult. The Viceroy telegraphed to the Secretary of State for India, on February 25, 1886, that it was proposed to lease the mines provisionally to Messrs. Gillanders & Arbuthnot, of Calcutta and Rangoon, on condition of an annual payment of two lacs and free examination by the Government. The Secretary consented; but on March 27 Lord Dufferin again telegraphed that a syndicate, formed by Messrs. Streeter, had offered three lacs per annum, and again, on April 14, that the local house offered three lacs, while Messrs. Streeter's agent offered four. The Secretary of State telegraphed, leaving the matter to the decision of the Viceroy, but asking that the value of the mines and the rights of the Government should be carefully ascertained before pledging the Government. The matter there rested until May last, when, on the 19th, Lord Cross telegraphed asking whether it was true that a contract on behalf of the Government had been signed, and that an application to visit the mines had been refused. Lord Dufferin replied that the terms under which the ruby mines were to be worked was still under consideration, but a memorandum had been signed which did not bind the Government, indicating the terms which the Government representative would recommend the Government to offer, and this had been communicated to Messrs. Streeter. At the same time the Viceroy in Council was of opinion that should the ruby mines regulation and terms of agreement finally decided on prove acceptable to Messrs. Streeter, they were entitled to be granted a lease in consideration of having sent in the highest tender. The Viceroy subsequently forwarded a statement of the proceedings in the matter of the ruby mines since the occupation of Upper Burmah, showing that the agreement on lease with Mr. Streeter had still to be settled by the law officers of the Government, and that it was not to commence until November 1 next. They had been careful to protect the rights and interests of the native miners. As to an agent named Unger, who had complained that he had not been allowed to inspect the mines, the Viceroy said he had never made a definite offer, and he never mentioned that Messrs. Rothschild, of London, were connected with the syndicate of which he was the agent. The Chief Commissioner did not consider his proposals sufficiently serious to justify him in postponing his decision in regard to the specific offers of two firms, especially as, when pressed to produce his credentials, Unger had declined to respond to the invitation. Lord Cross telegraphed to the Viceroy on June 6 asking his Excellency to make no arrangement with anyone without sanction from home. Replying on July 8 to a telegram from Lord Cross, the Viceroy said that Mr. Streeter's son had been granted a licence to dig for rubies under the old system, without machinery, but it was quite a distinct matter from the leasing of the Crown monopoly right, on which action remained suspended. Lord Cross finally wrote, on August 4, to the Viceroy that he had not sufficient information before him as to the value of the mines, or the effect of using machinery on them, and that before sanctioning any lease or agreement he proposed sending out experts to scientifically examine the mines. This decision was also communicated to Messrs. Streeter and to Messrs. Ogilvie, Gillander & Co.

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A NEW monthly comic contemporary has just been started in New York under the title of the *Waterbury*, for circulation among the jewellery trades. It is very comprehensive in its scope, and alternates in style between the serious gravity, almost, of the *Jewelers' Circular* and the humorous levity of *Stuff and Nonsense* (a very funny page from which latter is reproduced in the number before us) in a way well calculated to dissipate the most stubborn secretions superinduced by occupations of a sedentary nature.

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AFTER a trial extending over three days, Robert Felton was found guilty at the Middlesex Sessions, on the 19th ult., of stealing a quantity of jewellery belonging to Louisa, Dowager Lady Meux, and sentenced to five years' penal servitude.

# Kashmir.

By William Simpson, R.I., F.R.G.S., Hon. Assoc., R.I.B.A.

*(Continued from page 26.)*

INDIAN ear ornaments have a peculiarity which may be worth describing. It will be noticed that in Goolee's case these ornaments are in the form of a rosette which does not hang, but preserves a position with its outer surface parallel with the wearer's face. The Delhi lady has a similar ornament; but in her case it is smaller, and is not so noticeable from the profusion of gems around it. This position of the ornament is attained by means of a large hole in the ear. The lobe is first bored, and a small piece of bamboo is inserted; the bamboo is regularly changed for larger pieces, till the hole is widened to nearly half-an-inch in diameter. On the back of the ornament is a small tube which fits into this hole, and it is thus held in its place—exactly in the same way that the small jewel is held on the side of the nostril. I give a drawing of this tube (fig. 1) from an ear ornament I brought home with me; its length is exactly three-eighths of an inch, and its diameter is between that and half-an-inch. In some parts of India this hole in the ear is made still larger: in the Madras Presidency I have seen them quite an inch in diameter. In ancient India this practice of making large holes in the lobe of the ear was more prevalent than it is now. I give the copy of a man's head (fig. 2) from one of the old Buddhist caves of Ajunta, in which this will be seen. In the figures of Buddha (fig. 3) this peculiarity is one of the conventional points which the sculptors always represent: the ears are in every case shown as elongated—often as far down as the line of the shoulder—and with a long opening in the lobe. Buddha being an Ascetic, he has no ornaments on his person; but in the old sculptures we see other persons with large rings and ornaments, whose weight at once explains the elongation of the lobe. Goolee had large pendants to her ear ornaments, but these were not heavy; they appeared to me to be made of tinsel, gold wire and pearls. In my former account of a visit to a Delhi zenana, I mentioned that it was the custom with the women of India to have their ears bored with a number of holes for smaller rings; Goolee was no exception to this rule—she had three or four gold rings, but they are concealed behind the rosette.

I give a sketch of another Kashmiri dancing girl (fig. 4), as it shows a variety in the head ornaments: instead of the crescent forms we have here triangles. She also has rosettes in her ears, and the necklaces with the large pendant are similar in style to Goolee's.

It must be remembered that jewellery is not confined to the gentler sex in India. Men in that country, if they have the means, decorate their persons quite as much as the women. Rajahs, when they appear on state occasions, are often covered with an extraordinary amount of wealth. I remember the late Maharajah Holkar appearing at a durbar held in Jubblepore by Lord Canning, and it was whispered round that he carried on his body something like a million sterling. This high value often results from some celebrated gem being worn, the worth of which may cover the largest part of such a high estimate. When the Prince of Wales went to India, I was allowed the privilege of making a sketch of the Guikwar of Baroda; he was then a mere boy, and on this occasion he wore the celebrated necklace of diamonds, said to be worth two millions sterling. Rajahs are animated by the strongest desire to possess stones that are unique. The story is well known how Runjit Singh managed to get the Koh-i-noor; all his offers to Shah Soojah for this purpose had failed, and at last, during an interview, he forced an exchange of *puggrees* or turbans, which is a mark of great friendship in India: but in this case the Koh-i-noor was in Shah Soojah's *puggree*. The main objects of a Rajah's existence are to possess a splendid elephant, to ride upon on state occasions—the elephant must be large, and have all the points which are considered to form the perfect type of that animal—a larger gun than any of his neighbour Rajahs; and the largest and finest gems he can procure,

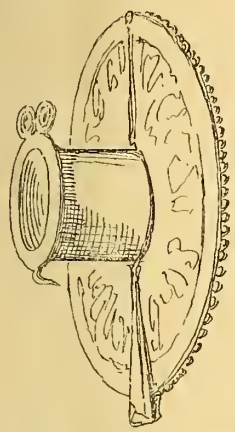

Fig. 1.—Back part of an Earring.

Fig. 2.—Head from a Painting in the Ajunta Caves.

Fig. 3.—Head of Buddha, Ajunta.


Fig. 4.—Muttee, a Kashmir Nautch Girl.


FIG. 5.—H.H. RUNBIR SINGH, MAHARAJAH OF JUMMOO AND KASHMIR.

historical ones if possible. Since the British Raj has introduced salutes, to the above must be added a burning ambition to increase his right to an extra couple of guns. Anyone who could gratify these royal tastes may command all that the Rajah's exchequer contains.

I do not know if Runbir Singh, the late Maharajah of Jummoo and Kashmir, had any celebrated jewels, or if he appeared in his richest gems when he sat to me for his portrait. I had to visit Jummoo, his capital town—this is the capital of the State of Jummoo, a territory between Kashmir and the Punjaub, the name of which comes first in his title. I spent a week there as his guest, and took portraits of him and his son, Pertab Singh, who is now the Rajah, as Runbir died about two years ago. I give a rough copy of the late Maharajah's portrait (fig. 5). The aigrette on the *puggree** is the same as that usually worn by Rajahs. I did not learn the name of the material in the central parts of this ornament: it was white and transparent; the upper portion was too large for one piece, and the small leaflets which ornament the sides were filled with what I take to be the same substance. Around the square central panel are four large rubies, and below are three pendant emeralds; the pendant from the top of the aigrette is also an emerald. He wore a tuft of heron's feathers in the *puggree;* the heron is a sort of royal bird in Kashmir, and it is a capital crime to kill one of them. The Rajah's ears must have been bored, for he wore gold rings, to each of which were attached three emeralds, one large and two small. He seemed to have a penchant for emeralds, for in addition to these he had a collar formed of them, and he also wore a necklace of two or three strings of pearls. The gold ornament in front of these had in its centre what seemed to be the same whitish substance which is in the aigrette. The circular form which is seen behind is his shield; it is held in its position by a belt of cloth of a deep yellowish brown. The other belt on the left shoulder with an ornamental buckle is the sword-belt; the buckle is of gold with six rubies, three above and three below. The dress was of plain white cotton, with a scarf of the same material over the left shoulder.

[Note.—Owing to a misprint in the first part of this article, Srinugger, the capital of Kashmir, appears as "Grinugger."]

## Magnetism in Watches and Chronometers.

*A Paper presented to the New York Electric Club by*

Lieut. F. W. Toppin, U.S.N.

A TIMEPIECE for the determination of a ship's longitude was unknown at the beginning of the 18th century; ships went to sea with the most primitive means for laying their course to distant ports, sailing by day and furling their sails by night, lest they might strike some unknown shore. Sea voyages were long, tedious and extremely perilous. In consequence, the maritime nations, and England especially, keenly felt the want of an instrument or timepiece for the determination of the longitude at sea. In the year 1714, during the reign of Queen Anne, the English Parliament passed an Act constituting a Board of Longitude, with certain powers. This Board found it expedient to offer three prizes of £10,000, £15,000 and £20,000 for the production of a good timekeeper, which would be the means of enabling mariners to find the longitude at sea within 60, 40 and 30 miles respectively. For fourteen years the offer remained fruitless, when one John Harrison, a self-made man from Yorkshire, presented himself with the offer to solve the problem; he had experimented on pendulums and invented the gridiron compensation.

His experiments on the effects of temperature on various metals suggested to him the principle of compensation to watches, in order to counterbalance the variation in rate by the expansion and contraction of the balance spring in heat and cold.

Harrison's compensation was effected by a laminated piece fixed to the plate at one end, and at the other carrying curb or regulator pins, between which the spring acted, and it was by the movement of these pins, to and from the stud, into which the terminal end of the spring was pinned, lengthening or shortening the acting portion of the spring, that the watch was regulated, this curb acting in the same manner as a watch regulator is moved by hand.

But, notwithstanding Harrison's suggestion that the compensation should be effected by the balance, the honour of constructing the first compensation balance is acknowledged to belong to Julien le Roy, the famous French watchmaker.

Harrison, having satisfied himself of the satisfactory performance of his timepiece by trials on board a barge, proceeded in one of the Government vessels to Lisbon. On this voyage he was able to correct the reckoning to within one degree and thirty minutes, and the Board of Longitude granted him £500 to enable him to improve his timekeeper.

After laborious exertions he was enabled to ascertain the longitude to within ten miles, or twenty miles less than the distance required by the Board of Longitude—but he did not obtain the full amount of the prize, set upon his accomplishment, till the year 1757, nine years before his death. Harrison was a man of extraordinary genius and perseverance, as he had a great many disappointments to encounter, and the present perfection of the ship's chronometer is greatly due to his exertions.

From this time forward to the present day unremitting exertions have been made to perfect the chronometer; both the English and French Governments have encouraged, by rewards, the improvement of the instrument. For a number of years the English Government has paid premiums of three, two and one hundred pounds yearly for the three best chronometers sent to Greenwich for competitive trial, knowing that there remained serious defects to be eliminated. But, as it was finally demonstrated that these premiums bore no fruit, they were withdrawn, and a Government purchase is the only stimulus given to individual effort beside the privilege, that the fortunate vendor may assume the title of "Maker to the Admiralty."

The defects still existing in our timepieces of precision appertain mainly to the adjustment for temperature and to such errors as are produced by the tendency of the metals, used in construction of certain parts, to influences which cannot be controlled. Harrison found that the adjustments for changes of temperature ought not to be made by a device acting on that part of the machine which was the principal cause of the error, namely, the balance spring, as such adjustments totally destroyed its isochronous properties, which were already unavoidably impaired by the balance spring losing its elasticity in changes of temperature. This adjustment had to be made on the balance by causing its laminæ, free at one end, to move to and from the centre. By this means, the momentum of the balance was changed in a direction to counteract the evil effects of the change of temperature on the length and elasticity of the spring balance pin. But all the corrections attained have failed to accomplish what was needed.

Astronomers, scientists and men of the greatest mechanical genius have grappled with the problem and report no progress, except the conclusion reached, that the employment of steel and brass in the manufacture of the spring is not desirable, moreover, failing as it does to meet the causes of disturbances, which cannot be controlled.

One of the most prominent of these uncontrollable causes of disturbances is magnetism. Until within a few years the only errors sought to be eliminated were those principally due to the changes of temperature. But a new problem has now presented itself, and that is, to meet the evil effects of magnetism.

The earliest scientific records notice the operations of a subtle natural agency, peculiar in many repects to bodies containing iron and acting more especially on iron and steel. By this agency ferruginous particles are drawn together and frequently in opposition to the force of gravity.

Notices of such phenomena are found in very ancient manuscripts, especially in those of China, and also in the writings of the Greek and Roman philosophers.

The existence of this subtle agency was first observed as a property of a mineral substance of a greyish black colour. The

* Turban is a word unknown in India, *puggree* is the name always used.

Greeks obtained it from the province of Magnesia, and termed it "magnes," from whence the term magnet and magnetism, the one designating the mineral substance itself, the other the peculiar agency supposed to reside in it.

In a celebrated philosophical poem by the Roman poet Lucretius, who flourished about 60 B.C., we find the magnet, with illustrations of its power, very beautifully treated.

In the translation of this poem by Dr. Busby, he thus renders the passage :—

"Now, chief of all, the magnet's power I sing,
And from what laws the attractive functions spring:
The magnet's name the observing Grecians drew
From the magnetic region where it grew;
Its viewless potent virtues men surprise,
Its strange effects they view with wondering eyes.
When, without aid of hinges, links or springs,
A pendant chain we hold of steely rings
Dropt from stone—the stone the binding source—
Ring clings to ring, and owns magnetic force:
Those held superior, those below maintain,
Circle 'neath circle downward draws in vain,
Whilst free in air disports the oscillating chain."

The earth is a great magnet, and currents of electricity are induced in all conductive material in which motion takes place at its surface. Consequently every piece of metal capable of polarity must be "magnetised," or in a magnetic state.

There are secular, periodical and irregular changes, to which the earth's magnetic force is subjected. Secular changes are such as are slowly progressive, and which run through a certain course in a very long period of time, returning finally to their original value. Periodical changes are certain regular changes or variations, happening in short periods of time, such as a day, a month, or even a year. Irregular changes are such as cannot be traced through any uniform course, and which are apparently not subject to any given law.

Magnetic storms come under the head of this latter class of perturbations, and it is to the illustrious Humboldt that we owe all our first knowledge of these facts. Being engaged at Berlin, in 1806 and 1807, in examining the changes in the declination of the compass needle for every half-hour, his attention was called to certain capricious agitations in its position, not referable to any accidental or mechanical cause, and which occasionally caused so great an oscillation as to lead him to refer it to a sort of magnetic reaction propagated from the interior of the earth. He accordingly designated those disturbances as "magnetic storms," as being analagous to the sudden changes of electric tension, which ensue in the electric storms of the atmosphere.

Magnetism meets us at every step, because steel and iron have entered largely into the process of construction and manufacture. Ships built of iron must not only be strongly magnetic, because of the vast quantities of this metal, which is subject to the action of terrestrial induction, but that by reason of the hammering of hundreds of thousands of rivets as well as from the bending of plates and bars during the process of construction, there must be an extremely high development of permanent magnetism. Each iron ship must have a special individuality of the magnetic distribution, depending essentially on the position of the keel and head whilst building, such a distribution having in each individual case a polar axis and equatorial plane conformable to those of the earth at the place where the ship is built. An iron ship may be looked upon as in itself a large permanent magnet.

Changes of condition of polarity are continually going on in all moving metals—the iron in a ship as well. Every time the ship pitches or rolls the polarity changes and has an influence on the compass needle and on the chronometer. Every time the direction of the ship is changed its magnetic condition is changed, and will have a consequent influence on the metal.

Magnetism is a condition, and it is the natural condition of the molecular atoms composing iron and steel. This condition may be made more or less "intense" by causes; the balance wheel of the chronometer is "polarised" and is a good compass needle in itself, as you will see by floating it on water, and is as sensitive to polar conditions and surroundings as the compass needle, although it does not show it to the eye, because the mainspring is driving it through these lines of polarity so rapidly; but it will show the result in its "rating." These variations in rating will show in every degree, from the fraction of a second up to the point of stopping, according to the strength of the magnetic force applied. The force of the influence exerted on a chronometer is exactly the same as on a compass needle. The same polarity which causes the needle to lurch one way or the other will have a corresponding effect on the chronometer balance, and a consequent change in "rate," or irregular time.

The practical application of electricity has made giant strides, and electricity applied mechanically means magnetism in some form. The appliances for generating electric light and motive power are pregnant with magnetism, contaminating the whole atmosphere surrounding dynamos, motors and wires.

The chances of injury to chronometers and to watches especially by magnetism, have been greatly multiplied by the development of the dynamo and its extensive application to electric lighting and other purposes; so it is very common to find magnetised watches in the hands of persons having no connection whatever with electrical appliances. A watch readily becomes sufficiently magnetised to derange its action and render it entirely unreliable. If the regulating part of a chronometer or watch—that is to say, a balance, together with the hair spring—should be badly affected by magnetism, which happens very often, it is clear that the timepiece will suffer more or less, according to the fineness of construction and delicacy of adjustment.

All these changes herein referred to have their influence upon magnetic metals, and, as I have before stated, those metals entering largely into the construction of the balances and balance springs of chronometers and watches, can we wonder why our timepieces are found inaccurate and unreliable?

The greatest case of error, as may be inferred by the foregoing, is our present compensation balance and our steel balance spring.

Little did John Harrison imagine, when trying to provide a corrective for the expansion and contraction of the balance and balance spring in changes of temperature, that, as shown by Berthoud, the changes in the elasticity of the balance spring were the real evil, and the expansion of the metal was really an insignificant factor compared to the former, as the combined expansion or contraction of the balance and balance spring is about one-fifth in effect, demanding compensation, while the changes in the elasticity of the balance spring demand the other four-fifths of the compensation needed.

The invention of the compensation balance is rather the result of inventive genius and practical experiment than a contrivance based on well defined mathematical and scientific principles. But without entering further into this part of the subject, it can be stated as a fact that, having a steel compensation balance and hardened steel balance spring, and our present annular compensation balance, the laminæ of which are made of steel and brass, we can obtain compensation for changes of temperature approximating accuracy for a change of 30° Fahrenheit only, unless the auxiliary compensation device is used, when we can obtain compensation for a wider range of temperature.

Makers of compensation balances are very particular about the quality of brass they employ for melting on the steel rim of their balances. Unsound balances frequently result from the quality of the brass; but it is not an uncommon occurrence that even in the best balances the laminæ separates when exposed for a long time to a very low temperature. Chronometers used in whaling ships stationed for a year or more at Behring Straits often meet with such a mishap. A sliding of the brass on the steel may be the cause. The unequal progression of the ratio of the two metals is a source of error, for steel has a decreasing ratio of expansion in heat, and brass has an increasing ratio.

Some English chronometer makers have demonstrated by experiment, without any practical result, however, that the necessity for compensation for temperature can be reduced to nearly one-tenth by employing glass balance springs: but these springs have to be made of great length and require much room, aside from the difficulty of making and applying them; they certainly never could be employed in watches.

In a competitive trial of a number of chronometers at the Bureau of Navigation at the Navy Department, Washington, during the first six months of the year 1886 three chronometers

were withdrawn from the trial on account of rust having developed on the balance springs. Now, if rust is liable to show itself so early as that, may I ask how many chronometers at sea are likely to be afflicted with this malady, particularly in the tropics? May I ask how many ships have been out of their reckoning on account of rusty balance springs?—for nothing destroys the time-keeping of a chronometer or a watch so effectually as the most diminutive speck of rust on the balance spring. The deep-seated conviction of this fact has induced watch manufacturers doing business with tropical countries to fit the better grade of watches with gold balance springs, but the life of the elastic properties of these springs was found to be short; and in observatory trials chronometers fitted with gold springs stood low on the list, and did not compare favourably with those having steel springs.

By the foregoing remarks and by some subsequent references emphasising the high and growing importance of possessing portable machines for accurate timekeeping, and the difficulty of attaining them, I desire to acquaint the members of the Club with what Mr. Paillard, a celebrated adjuster of Geneva, Switzerland, has really accomplished, and to show how far Mr. Paillard's efforts have contributed in eliminating or reducing the errors enumerated; for if he has succeeded, and bulletins from the Government Observatory at Geneva would indicate that he had, then to him belongs the credit of having made a most decided improvement in our portable timepieces and rendering a great service to modern horology.

Various metals have been suggested to take the place of steel, but it seems to have been left to Mr. Paillard, after fourteen years of experiment, to finally succeed in producing, in an alloy of palladium, a metal which is uninfluenced by magnetism or corrosion, and still retains those properties necessary to obtain the finest adjustment for changes of temperature.

Balances and balance springs made of this alloy are of an expansive property, and a specific gravity slightly in excess of steel, but possessed of the very important qualification that they retain their elasticity in heat in a high degree, as verified in observatory trials in various countries, thus reducing one of the worst errors inherent to a steel balance and spring, aside from its magnetic and oxidable properties; giving us a material which enables us to get a compensation approximating accuracy for a wider range of temperature.

Palladium is a metal of the platinum group, and was discovered by Woldston in 1803. Its specific gravity is 11·3, that of gold being 19, steel 7·7 and palladium alloy 8·5. It is more fusible than platinum and melts easily before the oxyhydrogen blowpipe at 2,840° Fahrenheit. In its pure state it is not so ductile as platinum.

In producing his balance Mr. Paillard used two different alloys of palladium having a differential expansive ratio in similarity to that of steel. In so doing he at the same time gave us a superior balance; for the two metals composing the laminæ of his balance are congenial, both being made of a palladium alloy and being fusible under different degrees of heat, having the necessary hardness and other qualifications. Numerous searching tests with balances in connection with the palladium alloy springs have given the most flattering results, and we have had in chronometers and watches containing these balances and springs superior time-keepers uninfluenced by the hygrometric condition of the atmosphere or any spasmodical electrical condition of the same, and excelling all previous attainments with the steel and brass balance and steel balance spring.

This question of magnetism and the necessity for protection of chronometers and watches against magnetic influences has called forth inventions of machines and devices for demagnetising timepieces that had become affected; also a sort of soft iron shield or armour for enveloping the watch movement, as a defence preventive against magnetic influences. These are mostly cures after harm has been done. There would be no need of these devices if those parts of the chronometers and watches which control the timekeeping qualities were made of metal absolutely unaffected by magnetism, and yet possessing the other necessary qualifications.

In the face of the certain fact, that electrical appliances shall become wider and wider in their range, and the aggressive tendency of electricity for lighting and as a promotive power, both at sea and on shore, we must be prepared to meet its magnetic influence at every step in our industrial occupations. In the discovery of this alloy of palladium, a timepiece has been produced that is non-magnetic and non-oxidable, and possessing those requisite and necessary qualities for fine and accurate adjustments to temperature and isochronism and will take rank among inventions of the highest order in horological science.

### Discussion.

Mr. C. J. H. Woodbury, of Boston: Although the paper naturally refers to the greater interest of life and property in navigation, as far as magnetism in the balance of a ship's chronometer is a factor in the question, yet it is doubtful whether there is a single watch in the room whose steel portions are not magnetised, attended with all the interferences with the rate which magnetisation causes, unless the balance and hair spring is free from steel. The first palladium hair spring which I ever saw was shown to me by Mr. Charles F. Brush, at Cleveland, in January, 1882. Of course it was absolutely unaffected by the magnetic fields of the electrical apparatus, but possessed physical properties equivalent to those of steel, as it was an excellent timepiece.

One of the morning papers to-day contained a telegram from Chicago stating that the North-Western Railroad were to inaugurate a quarterly inspection of watches carried by their men, and one of the requirements was that the watches should be provided with an anti-magnetic shield. Now, if this be correct it shows that the matter is receiving deserved attention, although the attempt at annulling the effects of magnetism, by either placing a magnetic force larger than the irregular and disturbing magnetic forces, or by applying magnetic forces in opposite directions, must in the nature of things be approximate methods, and inferior to those which carry the portions of watches beyond the pale of magnetic influence by the use of non-magnetic material.

The method of adjusting the compasses of iron ships by placing masses of iron, such as cannon balls, near to the compass, in such positions as may be determined by experiment to act with equal force and in opposite direction to the vessel's component of magnetism, is a similar process.

This invention of Sir William Thompson has been of great value to the interests of commerce by rendering the use of the compass practicable in iron vessels. But this method of adjustment is confessedly approximate, remaining correct after once applied, only so long as the local attraction which the masses of iron counterbalance remain constant.

The steamship "Pavonia," while making the port of Boston last March, had sailed for 500 miles by dead reckoning on account of foul weather, and approached the shore near to Duxbury, while the captain is reported to have said that the vessel must be somewhat north of Boston. The cause of this error of some 30 miles was due to the change in the component of the ship's magnetism, which may have been produced by the buffeting of the waves, an unusual distribution of the cargo, or by some other cause, making changes in the stresses applied to the vessel.

One of the earliest experiments in magnetism set forth in text-books on physics, shows how a bar of steel can be magnetised by striking it a few sharp blows; while we have a more homely illustration in the fact that steel drills are universally magnetic after being used.

I have with me a realistic example of the effect of electricity upon watches, showing you this watch which I wore when struck by lightning in the Pacific Mills, at Lawrence, six years ago this week. I had been thoroughly drenched by the shower before reaching the shelter of the mill office, and experienced no personal effects from the shock, which destroyed my watch, beyond a paralysis of the throat, which passed away after a few minutes.

[The watch was passed around the table for examination and showed on the back two straight black stripes, each about half-an-inch in width, extending across the back, and joining each other at one end, like a letter V. Three of the arbors in the

movement were broken by the lightning; but there was no discolouration inside.]

Mr. W. C. KERR said he had gained some very interesting information by being present. A few years ago he had a watch sent him from Switzerland. It was not affected by electricity, had been worn among dynamos and electric generators generally, and it always kept perfect time, and the conclusion he had come to was that there was not this general danger in electricity to timepieces that was imagined. This evening he had discovered that the reason his watch had not been affected was because it was one containing the non-magnetic parts mentioned in the paper of the evening—was, in fact, one of the early watches in which Mr. Paillard's invention had been used. This was a surprise to him, and he was pleased to now be informed why his watch had always been such a satisfactory timepiece when others so often failed.

Lieut. TOPPIN stated, in response to Mr. Woodbury's remarks about the "Pavonia," that between Patchogue and extending up the Atlantic coast towards Rockaway there was an outlying ledge of rocks consisting almost entirely of magnetite. There was a deposit of black sand on the beach from this ledge when there was a south-easterly storm, which, on being tested, proved to be 95 per cent. pure magnetite. Can we wonder that ships go ashore off this coast on account of such magnetic influences on their compasses?

In reply to the statement of Mr. Woodbury that he had noticed in the daily press that an order had been issued by the management of a Western railroad to require improved timepieces to be carried by all its trainmen, Mr. A. CONKLING stated that such a proposition was under consideration by the road, but had not been adopted.

## The Times are Out of Joint.

UNDER the above heading a correspondent of the New York *Jewelers' Weekly* writes:—Every day in the year this question—"What time is it?"—is asked a thousand times, either of those who carry watches or of the public clocks. The latter, however, so far as New York is concerned, are by no means reliable. This fact was first brought to the writer's attention by a gentleman from a suburban town, while on a visit to New York. He was a man of punctilious habits, and was for ever adjusting the hands of his watch in order to bring them to an exactness in time that might be counted by seconds.

He had set his watch in the morning by the clock in front of the Fifth Avenue Hotel, where he was stopping, and during his peregrinations about town had found occasion to change it back and forth at least a dozen times. He became bewildered. Finally he came to the logical conclusion that either his watch was worthless or the public clocks wrong. Investigation proved that the latter surmise was the correct one.

A number of local reporters recently made a tour of the town, having set their watches by the Western Union time-ball on a day when it dropped precisely at noon, and, taking that as a standard, they compared it with the principal public clocks of the city, with the following result:—

| | | | |
|---|---|---|---|
| Western Union time-ball | 12.00.00 | Gilsey House clock | 12.05.00 |
| Trinity Church clock | 11.58.30 | Fifth Avenue Hotel clock | 12.02.00 |
| Benedict's time | 11.59.30 | Tiffany's clock | 12.00.00 |
| St. Paul's clock | 12.00.30 | Con. Ch., Twenty-ninth Street and Fifth Avenue | 12.00.30 |
| *Tribune* clock | 12.01.00 | Brick Church, Murray Hill | 12.00.00 |
| Thurber's clock | 12.01.00 | Grand Central Station | 12.01.00 |
| St. John's clock | 12.00.00 | Barrett House clock | 11.59.00 |
| Jefferson Market clock | 11.59.30 | St. George's Church | 12.01.00 |
| Union Dime clock | 11.59.30 | | |
| Parker House clock | 12.01.00 | | |

The greatest difference in time lies between Trinity Church clock and the clock on the cupola of the Gilsey House. This difference amounts to 6 minutes 30 seconds. Of all those examined, only three clocks in the city coincided with the Western Union time—namely, St. John's, Tiffany's and the Fifth Avenue Brick Church.

## Tempering Steel with Electricity.

AT the shop of the Sedgwick Mainspring Co., 19 and 21, South Canal Street, Chicago, can be seen a very interesting application of electricity to the arts. It consists of tempering watch springs by means of the electric current. In one part of the room stands what is known to the trade as a one-light dynamo. The conductors from the dynamo lead to another part of the room, to a bench on which stands an ordinary oil tempering bath. One of the conductors connects with a point within the oil bath, and the other to a point without. The piece of flat soft steel wire that is to be tempered to the blue colour is fed under the contact point on the outside of the bath first, and then under the one on the inside. When it reaches the latter the circuit is complete, and the wire immediately and uniformly becomes heated. No means have been taken to measure the current exactly for the purpose of doing the whole work mechanically. The variation in the percentage of carbon in different pieces of steel forbids the delicate process of tempering from becoming a purely mechanical piece of work. Therefore, with the electric current as with a fire, the colour of the steel determines the length of time that it shall be heated.

Several advantages are claimed for this process of tempering. The chief one is that the steel does not have time to oxidise after it has been heated to the proper colour before it is under cover of the oil, and consequently that the steel wire is of the same thickness when it is tempered as it was before it entered the process. The heating is uniform throughout the length of the spring, and there is less liability of defective spots. The process is a rapid one, the springs being heated and passing into the bath at the rate of four inches a second.

The large watchmaking concerns look with great favour on the new process, and the Sedgwick Mainspring Co. are just about to double their capacity for the purpose of keeping up with their orders.

## Workshop Memoranda.

TO TEMPER SMALL DRILLS.—Mr. Charles Riess, in the *American Jeweler*, says:—The tempering of small drills for drilling holes in arbors, staffs, &c., which we find are very hard and difficult to be perforated, may be effected in the following manner. After having filed the drill to its proper size (being careful not to flatten the cutting face), you then warm it moderately, avoiding its becoming red, and run it into borax. The drill is thereby coated over with a crust of borax and secluded from the air. Now it may be hardened by heating it only cherry red; after this it is inserted into a piece of borax, or what is better still plunged into mercury; care should be taken not to breathe the mercury fumes in the latter case. By the heat of the drill the borax accommodates itself to it as it melts and cools off. Experiments made in various ways, by cooling in water, petroleum, &c., after the drill had received its coat of borax, were not followed by as favourable results as if the drill had been plunged into borax or mercury; without being brittle it will become exceedingly hard, and the watchmaker will be enabled to drill articles which could not otherwise be perforated with a drill tempered in the ordinary way. The use made by many watchmakers of broken broaches for making these small drills, with the belief that the broaches are made of the best steel is not always the case, because the steel used for them is frequently burned, which, of course, renders it thereby unfit for such small tools. Now, in order to make the quality of your drill a certainty, always take a new piece of round steel for that purpose.

To restore the lustre of dead silver-work, gild clock-cases, &c., dissolve one ounce of cyanide of potash in one quart of pure water, empty it into a bottle, and label it "poison." When to be used, place the article in an earthen vessel, cover it over with the solution, and in five minutes the lustreless appearance will be removed; preserve the fluid for future use.

Fine silver jewellery or filigree work can be cleaned and re-whitened in the following manner :—Take one ounce of borax and dissolve in eight ounces of water, put the articles to be cleaned into a porcelain dish with the solution, placing it over a lamp for about ten minutes and letting it boil. A clean pickle composed of one part of sulphuric acid to twenty parts of water, should be kept in a clean copper or porcelain dish, and when ready for use should be hot. Take the articles from the boiling borax and place them on a piece of charcoal, and with the spirit lamp and blow-pipe bring them to a dull red heat. Having satisfied yourself that the articles have been thoroughly and equally heated, let them drop into the hot pickle, being careful, as soon as the article whitens, to remove it from the pickle into hot water, immediately washing it with a soft, clean brush, using aqua ammonia and soap, and drying in boxwood sawdust. The parts required to be bright should be touched up with a burnisher. Great care must be taken that everything you use is clean and in good order.

## Correspondence.

*All Letters for Publication to be addressed to the* Editor *of* The Watchmaker, Jeweller and Silversmith, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

### [TRADE MARK LEGISLATION.]

Sir,—The Merchandise Marks Law Consolidation and Amendment Bill having now passed its final stage, the Board of Trade are entitled to the thanks of the mercantile community, and Lord Stanley of Preston and Baron de Worms, personally, to the fullest recognition of the perseverance and tact with which the measure has been piloted through both Houses of Parliament.

Exactly 25 years have elapsed since the passing of the Merchandise Marks Act of 1862, which, as a Bill, together with the Trade Marks Bill introduced in the same session, had been referred to a Select Committee, over which the late Mr. Roebuck presided. I remember how generally it was then felt that so great a change in the commercial dealings of the country as would be enforced under the new law should not, without ample notice to those concerned, be brought to bear adversely against the trading community.

Representatives from Provincial Chambers of Commerce and of those Committees on which I had previously been acting, with the object of securing increased legal protection for Trade Marks generally, and the establishment of a Government system for their registration, met in London. In the result, the Government Bill, to which the Royal assent was given on August 7, 1862, so far as concerned its most stringent clauses against dealers and factors, and in some respects manufacturers also, was so framed as not to come into operation until January 1, 1864. An interval of one year and five months was thus placed at the disposal of all concerned to prepare themselves for the great change about to be inaugurated.

The late Mr. Samuel Morley, on his own premises in Wood Street, pointing to the shelves by which we were there surrounded, told me at the time that he feared it would be impossible for any warehouseman or dealer, howsoever honestly he conducted his business, to avoid occasional, if not frequent, liability under the penal sections of the Act. That which applied to Manchester heavy goods and small wares, such as those to which Mr. Morley was referring, in no less degree affected the food and drink and tobacco industries, together with most others included within the 50 classes into which, for the purposes of the Registration Act of 1875, goods have since been divided.

The earliest proceedings taken of which I have any record were by Messrs. Broadwood and Messrs. Guinness, and were in both instances successful; but the value of the Act has always been rather of a deterrent than of an active character; and this in all probability for the reasons that transpired during the recent debate in the House of Lords on the second reading of the new Bill.

What was equitable in 1862 is no less so in 1887, even were the further legislation less severe in its bearing on traders. But, on the contrary, it is more severe, as has been throughout the avowed intention of the Government, and approved by Parliament.

It is thus that I am emboldened to ask the aid of the public Press, in order that by the giving of publicity to this letter the Government may be induced to devise, by the aid of the law officers, some means of suspending the coming into operation of the new law until, say, January 1, 1888.

The intervening period would then in no way prove more than sufficient for exhausting the stocks in the hands of retailers or in warehouses; and at least partially to consume what manufacturers, in some instances at very considerable cost, have still under their own control. In pressing for the delay asked, I am giving expression to the wishes of those who desire to conform, but are at the same time naturally anxious to minimise the financial loss involved; and, above all, to save their factors and retail agents from the annoyance and attendant risk of proceedings taken under the Act.

Henceforth, when their labels, &c., have been remodelled so as to comply with the requirements of the Act, manufacturers will secure the full protection obtainable under registration. Illusory, in many instances, heretofore, have been the rights believed to be gained in respect of certain marks (mostly as labels) placed on the Register. As has been recently held by the Courts, no exclusive property can be maintained in that which embodies statements which are untrue in fact. There is no protection in equity against, nor possibility of obtaining damages in respect of, imitations of trade labels of this character, so that the misrepresentation made by any one trader could be repeated *ad libitum* by any number of other traders, and the public deceived, or not, as the case might be, by all or none.

Manufacturers who for the moment may be under the impression that their interests are likely to suffer by the enforced system of truthfulness that must prevail in the statements in future attached to their goods will in the end discover that the contrary is the result.

The public here when buying British manufactures, honestly draped in native garb and described in plain English words, on finding the goods purchased—whether tobacco, clothing, articles of food or drink, or aught else—identical with what has been hitherto put forward under foreign plumage with fictitious names and addresses, will experience no regret that the petty deceptions too long sanctioned by trade usage are now brought to an end.

Similar will be the result in our Colonies; whilst in foreign countries the fair repute for commercial honesty long claimed by the United Kingdom will be re-established, and the best of examples set to all the other trading nations of the world.

I am, Sir, your obedient servant,

Edmund Johnson,
*Hon. Secretary of the London Trade Marks Committee, and Manager of the Trade Marks Protection Society.*

1, Castle Street, Holborn, London, *August* 13.

## Answers to Correspondents.

Ignoramus (Leeds).—The only useful mode of giving the technical instruction you suggest would be in combination with a practical course such as is given at some of the institutions you mention. If the latter cannot be obtained, the next best thing for a beginner to do is to read up the numerous standard works applicable to his craft, and to experimentally put in practice the theories therein dealt with. Want of necessary space only allows us to deal summarily with the many subjects of interest to our various readers, and the course you propose is beyond our scope. We are afraid you are only one among a great many who have afterwards had to find out for themselves what should have been taught them during the period of their apprenticeship.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

10,267. W. H. Sheldon and G. Mason, Birmingham, for "Improvements in jewellery and articles connected therewith." Dated July 22, 1887.
10,289. W. Greenwood, York, for "The protection of watches." Dated July 23, 1887.
10,342. A. R. Wilson, London, for "Improvements in the method of securing the bows of keyless and other watches to their pendants." Dated July 25, 1887.
10,588. F. Fenton, a communication from J. Woolford, France, for "Improvements in extracting gold from simple, compound and refractory ores, or slags, wastes, cinders of ores or metals containing gold or gold blends." Dated July 30, 1887.
10,594. J. Vautin, London, for "An improved method of extracting gold from the various auriferous ores." Dated July 30, 1887.
10,742. H. Duboulet, London, for "Improved mechanism for winding up clocks, watches and the like." Dated August 4, 1887.
10,785. J. G. Lorrain, London, for "Improvements in self-winding clocks." Dated August 5, 1887.
10,792. J. G. Lorrain, London, for "Improvements in self-winding clocks." Dated August 6, 1887.
10,930. P. Brimelow, Bury, for "Improved automatic clock indicator for measuring any required length of fibrous materials, such as cotton, worsted, silk, &c." Dated August 10, 1887.
11,025. J. Coombs, London, for "Improvements in ore separators or gold extracting machinery." Dated August 12, 1887.
11,134. H. O. Stauffer, London, for "Improvements in repeating watches." Dated August 15, 1887.
11,191. H. Steinheuer, J. Steinheuer, H. Rabe and E. Rabe, London, for "Improved apparatus for winding up the driving mechanism of clocks." Dated August 16, 1887.
11,278. H. N. G. Cobbe, Birmingham, for "Improvements in self-winding clocks." Dated August 18, 1887.

## Recent American Patents.

| | |
|---|---|
| Alloy. C. A. Paillard | 367,159 to 367,161 |
| Alloy, Metallic. C. A. Paillard | 367,158 |
| Burglar Alarm. Wade & Burras | 366,537 |
| Chuck. G. L. Jones | 366,485 |
| Clock-winding Mechanism. A. Robinson | 366,429 |
| Dead Centres, Device for overcoming. S. T. Shortess | 366,433 |
| Dial Figuring Machine. A. T. Westlake | 366,987 |
| Drilling Machine. J. Bailey | 366,366 |
| Emery Wheels, Tool for Dressing. H. K. Forbis | 367,287 |
| Engravers' Tool or Scraper. A. Bonniol | 366,297 |
| Eyeglass Holder. M. Riggs | 366,345 |
| Eyeglasses or Spectacles. I. Fox | 366,471 |
| Metals, and utilising the same for Metallurgical purposes, producing Silicious. C. Hensler (*r*) | 10,852 |
| Music Box. A. Juuod | 366,325 |
| Ore Concentrator. H. F. Learnard | 366,631 |
| Pendulums, Electric Controlling and Regulating Device for. W. S. Scales | 366,513 |
| Ratchet Drill and Die Stock combined. A. Loelmer | 366,965 |
| Rolling Mill Appliance. C. H. Morgan | 366,236 |
| Scarf or Necktie Holder. G. S. White | 366,284 |
| Sheet Metal Bending Machine. P. Kimmel | 366,486 |
| Sheet Metal, Ornamentation of. J. Wood | 366,286 |
| Soldering Machine, Can. W. H. H. Stephenson | 366,271 |
| Watch Case. C. K. Giles | 367,288 |
| Watch Cases, Machine for Making. E. Keller | 366,778 |
| Wind Vane Motor for Clocks. A. Hitt | 366,834 |
| Window Clock. H. Pennington | 366,683 |
| Window Reflector. K. Frekker | 366,624 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Gazette.

### PARTNERSHIPS DISSOLVED.

Quin & Romer, Newman Street, Oxford Street, jewel case makers. Phelps Brothers, Birmingham, goldsmiths. William Washington and Samuel Washington, Morecambe, Lancashire, polishing paste manufacturers. Bishton & Fletcher, Birmingham, jewellers. John Baker & Co., Sheffield, cutlery manufacturers. Dutton & Powers, Lower Broughton and Manchester, silversmiths. B. & L. Hammett, Barking Road, Canning Town, and Cambridge Place, Plaistow, pawnbrokers.

### THE BANKRUPTCY ACT, 1883.

### RECEIVING ORDERS.

*To surrender in London.*—Andreas Furtwangler, Strand, watchmaker. Bryce McMurdo Wright, Regent Street, mineralogist.

*To surrender in the Country.*—Edwin Buswell, Brecon, jeweller. Benjamin Sargent, 12, King's Road, St. Leonards-on-Sea, Sussex, jeweller. Joseph Bromage and Frederick Bromage (trading as J. & F. Bromage), Birmingham, manufacturing jewellers. Isaac Elsner, Birmingham and Edgbaston, pawnbroker. John Green, Sheffield, pawnbroker. Clara Ann Rollaston (otherwise Twist), Birmingham, pawnbroker.

### PUBLIC EXAMINATIONS.

*In the Country.*—W. H. Stokes (trading as John Stokes & Son), Birmingham, manufacturing jeweller; September 9, at 11. T. Marston (trading as T. Marston & Co.), Birmingham, jeweller; September 12, at 2.

### ADJUDICATIONS.

*In London.*—A. Paillard (trading as A. Paillard & Co.), Holborn Viaduct and elsewhere, musical instruument importer.

*In the Country.*—J. Jennings, The Pavement, Surbiton, watchmaker. E. Buswell, Brecon, jeweller. J. Fletcher, Birmingham, jeweller. W. Hayward, Christchurch, watchmaker. F. G. Baker, Shanklin, watchmaker. B. Sargent, St. Leonards, jeweller.

### NOTICES OF DIVIDENDS.

*In London.*—George Charles Haider, 65, Hatton Garden, diamond merchant; 1¾d., second and final; any Wednesday, Sesar, Hasluck & Co., 23, Holborn Viaduct. E. Scott and J. F. Beckett (trading as Scott & Beckett), Myddelton Street, manufacturing jewellers: 1s. 8d., second and final; any Wednesday, Sesar, Hasluck & Co., 23, Holborn Viaduct.

*In the Country.*—B. Whitaker, Burnley, working jeweller; 8d., first and final; August 4, Official Receiver, Preston. J. A. Ensden, Gainsborough, jeweller; 7s., first; on and after August 5, G. Gay, Lincoln. A. Carson, Manchester, watch importer; 4s. 6d., first: November 27, 5, Winckley Street, Preston. C. Taylor and W. Taylor (trading as C. & W. Taylor), Coventry, watch manufacturers; 3s., second and final: August 12, Official Receiver, Coventry. R. H. Cheetham, Southampton, cutler; 1s. 1½d., first and final; August 15, Official Receiver, Southampton. J. G. Needham, Sheffield, watchmaker; 3s. 4d., first and final: August 18, Official Receiver, Sheffield. J. Sheldon, Stockport, jeweller: 1s. 2½d., first and final: any day, Official Receiver, Macclesfield.

### AMENDED NOTICE.

H. G. Bloor, Sheffield, electro-plater; 1s. 5d., first and final; April 4, Official Receiver, Sheffield.

### SCOTCH SEQUESTRATION.

J. Waddell, Glasgow, watchmaker.

## Buyers' Guide.

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

VOL. XIII.—No. 4.] OCTOBER 1, 1887. [Subscription, 5s. per Annum. { Post Free.

## SPECIAL NOTICE.

**Our correspondents are kindly requested to note that the Office of this Journal has been removed to more commodious premises at No. 7, St. Paul's Churchyard.**

CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to
THE WATCHMAKER, JEWELLER & SILVERSMITH,
7, ST. PAUL'S CHURCHYARD, LONDON, E.C.
*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

SOME time since, one of the comic papers (we think it was our old friend *Mr. Punch*) published the following "Conundrum for the considerate:" "Why is happiness like an Act of Parliament?" the answer given being, "Because you can never tell its value until it is passed." Well, what, in some of its clauses, is essentially a watchmakers' Act is passed, and whether or not the various branches of the horological trades were happy before, it is at least quite certain that many of them are not so now it has become *un fait accompli*.

In previously commenting on the measure as it was at first proposed, we attempted to deal with its possible effects on the trade as a whole; and, while avoiding as much as possible the invidiousness due to a more detailed consideration of the subject, pointed out at the same time the difficulties of satisfactorily formulating and administering enactments of the kind.

The appositeness of our remarks is now sufficiently manifested by the state of uncertainty and apprehension prevailing among many branches of the trade which the Bill was never intended by the majority of its advocates to affect, and to whom it must, if vexatiously administered, do an incalculable amount of injury. There can be no doubt about the facts of the case, and English watchmakers should, in their own interests, study it in all its bearings. The Bill is the direct outcome of the on all sides admitted grievance of foreign-made goods being made in imitation of and sold as English; and, so far as watches were concerned, this was rendered possible mainly in consequence of their bearing the English Hall-mark in the case, which, from usage, has become to all intents and purposes a trade mark.

Having already fully discussed this part of the question, it is unnecessary to further enlarge upon it here, saving to remark that, had legislation been limited to the remedying of this point, a good deal of the present complication would have been avoided.

However, those responsible for the Act did not apparently see their way to stopping at this stage, and so we have, according to Section 7, the Hall-mark "constituting, or considered as constituting, a description of the country in which the watch is made,"

*primâ facie*. The Hall-mark is in future to be considered a trade description within the meaning of the Act, and, for the purposes of Section 7, the expression "watch" means all that portion of a watch which is not the watch case.

What effect the Bill is to have on the future trade of the country is an open question, upon which opinion is very much at variance: those in favour of it saying it will greatly benefit the trade by stimulating various branches of English manufacture and re-introducing others that are lost; while those opposed to it say it will react favourably on foreign-made goods, and eventually overcome prejudice against the same by demonstrating their relative cheapness in comparison with home productions. But whatever the general consequences may be to manufacturers here, there can be no doubt but it will fulfil one of its best objects if it effectually prevent the sale of foreign-made imitation English watches. The wholesale trade that has been done in these goods is one of the chief causes for the summary manner in which the Bill has been introduced. On the other hand, however, there is always a danger, in the inconsiderate application of such drastic measures, of doing injustice to persons perfectly innocent of any desire to trade under false pretences or act in any other than good faith. Such are the numerous manufacturers of *bonâ fide* Swiss watches (bar-watches, having not the least resemblance to English work), who would indignantly repudiate the charge of unfair dealing; and of all those English manufacturers who have availed themselves of opportunity of using Swiss parts (bearing, however, a small proportion to the entire watch, from jewel screws to the repeating mechanism, which cannot be made in this country), to the mutual advantage of the public and their own reputation.

To class such persons in the same category with the dealers before mentioned is obviously both unfair and illogical; yet this is what the Bill literally interpreted does, and the fact that it does so shows the necessity existing for a test case. That comparatively few repeaters and other complicated watches are sold in this country, is no reason for English watchmakers handing over a small but profitable branch of the trade to the Swiss. Besides, a clearer definition, or, as Dr. Johnson says, such an explanation as is equivalent to a definition, of the meaning of the Act is necessary on principle. As a matter of fact, hardly a manufacturer could be found in England who would not be amenable to the law in some form if it were to be construed *au pied de la lettre*, in accordance with the notions of certain sections of the trade, who imagine such a construction would create monopolies in their favour.

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Mr. Edward Waterton, F.S.A., whose death was recently announced, distinguished himself as a collector, and was engaged at the time of his death in forming a collection of rare editions of Thomas à Kempis. It is, however, for his splendid collection of rings (especially episcopal) that he is best known. This, exhibited at the South Kensington Museum, will be familiar to most of our readers. Mr. Waterton, who was the son of the famous naturalist, Charles Waterton, descended collaterally from Sir Thomas More; and among the many souvenirs he possessed of that distinguished man is the curious clock painted by Holbein in the well-known picture of Sir Thomas More and his family. This clock still stands in the old hall of the Waterton mansion, and, we hear, keeps pretty good time.

Speaking of the old hall reminds us of an odd incident. The Watertons have ever been strict Roman Catholics; and Charles Waterton especially observed the fasts of the Church with rigorous exactness. One day a friend of his called at the house. The would-be guest, a Member of Parliament for a southern county, found that it was a strict fast day, and that Waterton was not to be seen on any pretence. The visitor described the circumstance to a friend in these words:—

"There were cases of stuffed birds
All round the old hall;
But my case was a case
Of no stuffing at all."

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# General Notes.

The September number of *Good Words* contains the first part of a paper entitled "The Experiences of a Meteorologist in South Australia." It is from the well-known pen of Mr. C. L. Wragge, F.R.G.S., and will be found well worth perusal.

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Mr. Henry Irving has promised to visit Stratford-on-Avon on the 17th inst., to inaugurate the Memorial Fountain and Clock Tower which was described in our August issue. The United States' Minister (Mr. Phelps) and Mr. Lowell will also be present.

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The Superintendent of the Indian Geological Survey has reported on the auriferous tracts in Mysore. He found many workings where the reefs were of promise. In a hurried tour he chanced upon no fewer than five sets of old workings unknown to previous surveyors.

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From the Burmah Ruby Mines comes the news that revenue, collected at 30 per cent. *ad valorem*, is coming in satisfactorily, and will likely greatly exceed Messrs. Streeter's bid; so that already, asserts an Indian paper, the folly of giving leases without knowledge of the circumstances is apparent in this case.

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The sale of the French Crown Jewels, it is now officially reported, has produced the net sum of 7,207,252 fcs. and 50 centimes. The historical heirlooms which were not sold represent a far larger amount. Such of them as have been transferred to the Louvre Museum are estimated at £510,000 sterling.

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We are informed by Mr. Sidney Webb that the Working Men's College, 46, Great Ormond Street, W.C., now provides technical instruction in all subjects for which a minimum audience of twelve be guaranteed by any responsible club, institute or other organisation. Applications for information should be made to the Secretary.

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According to a contemporary, there is reason to believe that the Colonial Governments, in conformity with the views expressed at the recent Colonial Conference, will shortly propose legislation similar to that embodied in the Merchandise Marks Bill just passed. As will be seen by the recent speech of M. Rouvier, the French Government also contemplate action with the view of suppressing false trade marks.

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The Manchester Chamber of Commerce recently discussed and confirmed a claim of a special annexe for Lancashire at the forthcoming Melbourne Exhibition. Various speakers at the meeting pointed out the importance of maintaining and cultivating our trade with the Australian Colonies. Here is a good opportunity for our movement makers and others to show they are alive to the altered conditions of the watch trade likely to be produced by the Merchandise Marks Bill.

The proceedings of the British Association at Manchester came to an end on September 7, when the President read a communication from the Economic Science and Statistics Section to the effect that the Council be requested to consider the advisableness of organising an International Scientific Institute, with power to correspond with other existing institutions on the Continent and in the United States. The proposal being discussed was disapproved.

Speaking at the meeting of the British Association on September 2, the Hon. John Forrest, C.M.G. (Commissioner of Crown Lands and Surveyor-General of Western Australia), said that during 1886 about 10,000 diggers proceeded to the gold fields at the head waters of the Fitzroy and Ord rivers, and that, although many returned disappointed, the permanency and richness of fields is now firmly established. By the last mail from the colony, he learnt that one man had recently obtained a hundredweight of gold, and that in one ship 3,000 ounces were exported from the district.

On the occasion of the marriage of his daughter, Mr. B. H. Joseph (of Messrs. B. H. Joseph & Co.) entertained his employés, numbering over 60, for a day in the country. On the previous day they presented the bride with a very handsome oak despatch box of stationery, the lid of which bore a silver plate with the following inscription :—

Presented to Miss Annie Joseph, on the occasion of her Marriage, by the Employés of Messrs. B. H. Joseph & Co., September 9, 1887.

A new alloy has been discovered by Herr Reith, of Bockenheim, which is said to practically resist the attack of most acids and alkaline solutions. Its composition is as follows : copper, 15 parts ; tin, 2·34 parts; lead, 1·82 part; antimony, 1 part. This alloy is therefore a bronze with an addition of lead and antimony. The inventor claims that it can be very advantageously used in the laboratory to replace vessels or fittings of ebonite, vulcanite or porcelain.

A tool to be used for the heating of shellac, &c., as employed in the setting of jewels, pallet stones and similar work, has been patented by Mr. Frank Heller, of Oakland City, Ind. It is made by forming twists or coils in the discharge end of a blowpipe, and surrounding these twists or coils by a ball or jacket of metal, the nozzle projecting outward through a proper opening. This ball or jacket of metal having been previously heated, the air forced through a tortuous course within such body of heated metal affords a hot blast, which may be delivered against the shellac without subjecting the surrounding parts to the action of the flame by which the heat is produced.

The Parisian watchmaker, Schwob, has brought out a new chronographic watch *(montre-observateur)* which is a marked improvement on the ordinary stop-watch. The face is furnished with a second small dial similar in size to the seconds' dial. By touching a knob, the hands of this dial, which is a complete copy of the large one, are at once replaced to twelve o'clock and then continue their progress from that point. This method is very practical, as it not only shows the time of commencing an observation, but infallibly determines its duration without the least trouble, all the observer having to do for this latter purpose being simply to read the time indicated by the small dial, and to subtract that time from the true hour of the large dial. This can all be done without exercising any memory or making any note. We think the invention invaluable for making astronomical or other observations ; the eye need not be even turned to the watch in touching the knob, which can be done in perfect darkness. A sleeper in suddenly awakening from a nightmare, or hearing a strange noise at night, and wishing to fix the time of the occurrence, need only press the knob of his watch and turn his head quietly round on the pillow, knowing that in the morning he will have the exact hour and minute correctly registered.

The Winterthur (Switzerland) correspondent of *Industries* says :—The establishment of a large association, embracing all the smaller societies in the clock and watch making trades, is one of the most important events in the industrial history of this country. For a long time past the Geneva watch trade has been in an unfavourable condition, and the great success which resulted from the Association of Machine Embroiderers seems to have given an impulse to the formation of a powerful society containing both masters and men engaged in the watchmaking industry. At the present moment the Association contains 9,000 members, but it is expected that this number will shortly be increased to 12,000. The affairs of the Association are administered by a standing committee, to which men, foremen, managers and masters have to apply for information and advice. Trade disputes are to be settled amicably by a special committee consisting of a president and fourteen members, half of the latter being workmen and the other half masters ; the president, however, must not belong to either category, so that his judgment may not be biassed. Provision has been made in the rules for the affiliation of foreign societies and syndicates, in case such a step should appear desirable at a future time.

Adelaide Exhibition Awards.—The awards of the jurors were completed on the 14th ult. Of the 237 British exhibitors, 93 have secured recognition in the shape of medals and certificates. Messrs. Dent & Co., of London, and Ellis & Co., of Sheffield, receive gold medals for watches and cutlery respectively.

The Paris Exhibition.—A semi-official communication relative to the Exhibition of 1889 is published, in which it is stated that it is proposed to fix April 1 as the very last date for demands for space. Pending the regular working of the committees, foreign exhibitors may apply direct to M. Georges Berger, in Paris. Intending exhibitors are invited to send in their applications as early as possible, "in order to enable the Superior Administration of the Exhibition to allot spaces to the advantage of all."

The Diamond Market.—The *Amsterdam* and *Antwerp* folk are still grumbling at the price at which rough is maintained, but probably as the factories are all reported to be in full activity, not much attention need be paid to these complaints. After all it resolves itself into a question of supply and demand, and as there is plenty of stuff in the market, those who have it to dispose of must obviously get rid of it somewhere. The success of the great Russian fair of Nishni Novgorod brought many buyers into the market, but the competition among the sellers prevented good prices being obtained. Small goods are the only ones in demand, but prospects are thought to be improving generally.

*Paris* reports state that the market for finished goods has revived a little, considerable parcels having been bought for foreign account, but the home trade is still in a dull state.

The steamers "Warwick Castle," "Tartar," "Hawarden Castle," "Athenian" and "Norham Castle" arrived at Plymouth during the month, bringing large consignments of current stuff. Numerous Continental buyers have been attending the sales, and valuable parcels have changed hands.

Latest from *Kimberley*, dated August 20, states that during the early part of the week there was a strong demand for all classes of fresh stuff, but after the receipt of cablegrams reporting on the shipment, the inquiry became less active; there is, however, no appreciable change in quotations.

Cablegram from the Central Diamond Mine, Kimberley, reports results for the first fortnight of the past month : hauled, 30,000 loads blue ; washed, 35,000 ditto ; diamonds found, value £51,000.

Silver.—Slight fluctuations in nominal prices have characterised the market during the past month, very little business having been transacted. Towards the end of the month, however, some business in bars for the East has left the quotations very firm at 44½d. per oz. for bars, and 43⅝d. per oz. Mexican dollars.

## Trade Notes.

A NOVELTY in watches has just been brought out by the Berne firm of Joannot Baltisberger. This consists of a keyless watch with a compass at the back, both watch and compass having luminous dials. It has been recommended by the French War Minister for use by the officers of the army.

We commend to the notice of the jewellery trades a little pamphlet just published by Moody's Printing Co., 10, Dale End, Birmingham; price 3d. It is entitled "The Advertiser's Guide to Publicity," and contains extracts from the utterings of public men, from Demosthenes to T. P. Barnum, which are well worth perusal.

Mr. Thomas Jeffery, late Controller of the London Postal Service, has been presented by the clerical staff, on his retirement, with a magnificent hall clock, which chimes the Cambridge quarters on four gongs, and strikes the hours on a powerful tenor gong. The case is richly decorated in the Louis IX. style. Mr. J. W. Benson, of Ludgate Hill, is the maker.

We have received from Messrs. J. Radges & Co., of Coventry and 5, Thavies Inn, Holborn, their newly published price list of sterling silver and 18-carat Hall-marked English lever watches. The catalogue, which is well got up, is fully descriptive and is furnished with upwards of 40 illustrations. Partieular attention is paid to the requirements of the Colonial trade, and at the present juncture it should be in the hands of all watch exporters.

Messrs. Askham Brothers & Wilson, Limited, are the makers of a new patent ore separator, in which a continuous current of air circulating through a descending stream of partially crushed material, separates the fine particles from the coarse, the latter being returned to the grinding machinery to be further reduced. The separator occupies but little space, and is driven at a slow speed. It can be applied to most descriptions of crushing or grinding machinery.

Complaints of the supineness of our art workers in the matter of originating designs are (although too often not altogether without foundation) more easily made than answered. It is therefore pleasant to be able to occasionally practically demonstrate the unfounded nature of sweeping charges of this kind. On an advertisement page in our last issue will be found an illustration of a masonic emblem, which in a limited field shows high artistic merit. The jewel is made by Messrs. B. H. Joseph & Co., of Frederick Street, Birmingham, whose name is a sufficient guarantee as to the quality of the workmanship.

Messrs. Haswell & Sons, of Spencer Street, E.C., have introduced a very useful adjunct to the "Bolcy" lathe. This is a nest of drawers (fixed underneath the box which contains the lathe and its parts) for containing the ordinary requisites of a watchmaker. As it has a separate cupboard arrangement which may be locked up, it can be used with or apart from the lathe itself. The one we inspected was made in walnut, and formed a very portable and handsome addition to the "B" size lathe to which it was fitted. It should prove an exceedingly valuable item in the equipment of watchmakers going to the Colonies, &c.

Goldsmiths and Jewellers' Annuity and Asylum Institution.—The annual dinner of the above institution is announced to take place on October 31, at the Holborn Restaurant, on which occasion the chair will be taken by the President, Major George Lambert; and the Committee make a special appeal to subscribers to support him, both by their presence and contributions, not only as a testimony to the general respect in which he is held, but also with a view to add another item to the memorable character of the year, by rendering more happy the prospects of those now applying to the institution for assistance.

## Birmingham News.

From Our Correspondent.

I HEAR that some of the Jubilee work is getting returned as unsaleable, and the only outlet for most of it will be the melting pot; but I suppose no one will be surprised at this.

* * *

I have seen a few samples of Florentine mosaic work, which are very pretty and artistie, but as these do not find much work for the jeweller I expect they will not be pushed.

* * *

There is evidence of a fair amount of trading for the jewellers after this month has closed. Several firms have commenced full hours again and filled up some of the vacant places in the workshops; and there is a possibility of a fair trade up till the end of the year, though I think that "overtime" will scarcely be needed.

* * *

The two extremes (low priced and expensive) seem to be the classes of goods going. There are some large orders about for silver jewellery of a showy common quality, set with "foiled back paste," and on the other hand some of the diamond mounters are fairly busy, but the medium class of coloured gold work is still very flat.

* * *

There are still numbers of workmen in the jewellery branches seeking situations. They are for the most part indifferent workmen, still I know of some few to whom this does not apply—men who are capable and willing, and such as would have commanded good wages a few years back. Gem setters are in the greatest demand, there being no good ones to be found out of employment.

* * *

The rising generation of jewellers and metalworkers have some opportunities for technical learning that their predecessors were quite unable to get, and it will be their own fault if they do not obtain a considerable amount of knowledge of the chemistry of the metals they work in. If they will look down the very extensive list of classes in metallurgy at the Birmingham Midland Institute, and select the one which applies to their particular branch, they will find that Mr. Hiorns and his staff of very able and obliging assistants will do their best to assist them in every respect. Of course they will require a considerable amount of industry on their own part, but they will have every facility given them, and at very low fees: the total list of classes for the winter session really strikes one as being magnificent. If they will add to that the art education, to be obtained at the School of Art in Edmund Street, under the management of Mr. Edward R. Taylor and staff, or at the numerous branch classes attached, they will receive such a training as will enable them to compete with the world and to uphold the reputation of their town. I have had the pleasure of attending both institutions as a student, and hold them in very high esteem. It is by such means only that we can hope to rise above mediocrity.

* * *

Watch jobbing is passing through a very trying ordeal at the present time here; a few indifferent workmen having commenced repairing at starvation prices (which cannot possibly last long), are doing considerable injury to that branch of the trade by creating a false impression among the public that a watch can be cleaned for one shilling. The public will find in time that this is quite impossible, and that they have been imposed upon by bogus workmen; they will arrive at this conclusion when their watches have been "cleaned and repaired" about six times where once should have sufficed, and that their watches have been considerably damaged into the bargain. In the meantime conscientious workmen are suffering, but they will reap their harvest later on. [Let us hope so.—Ed.]

# The Birmingham Jewellers and Silversmiths' Association.

THE Committee that were appointed in August last to formulate the rules and objects of the Association which was then decided upon, having completed their labours so far, a second meeting of the trade was called on the 12th ult., at the Middle Class Schoolroom, Frederick Street, Birmingham, to thoroughly discuss the rules as drafted by the Committee.

In response to the invitations, about 60 members of the wholesale and manufacturing trades attended, including Messrs. J. W. Tonks (T. & J. Bragg), Charles Green (C. Green & Sons), H. Payton (C. Payton & Sons), J. Jacobs, Cox (Cox Brothers), J. M. Davis, H. Hyde, Wainwright, J. Adie (Adie & Lovekin), W. J. Ginders, J. M. Banks, B. H. Joseph, Geo. Basnett, Freeman, Izon, Fridlander, Platnauer, Smith (Smith Brothers) and Holmes.

On the motion of Mr. Green, Mr. Jacobs was voted to the chair, and, after the reading of the minutes of the previous meeting by the Honorary Secretary (Mr. J. W. Tonks),

The Chairman remarked that, in accordance with the resolution passed at the previous meeting, the Committee had met together on several occasions to take into consideration the rules now before them, and it was for those present to say if they should be passed. If so, the Association would commence its existence at once. He believed in the establishment of a thoroughly sound Association, whose chief object should be the protection of thoroughly honest traders against dishonest traders, and by its influence a better trade amongst jewellers would be brought about. He then read the objects and rules, and asked that comments be made on each.

The name, "The Birmingham Jewellers and Silversmiths' Association," was decided upon without comment.

Then followed the objects :

"(*a*) The advancement of taste in the manufacture (and purchase) of jewellery and personal ornaments of gold, silver or other materials (by judicious suggestion and sound criticism in the public papers, by giving due attention to the movements of fashion in society, and by seeking to direct those movements into artistic channels); by combined efforts to develop the art education of employers and employed; by taking measures for the continuous instruction of apprentices and young persons in the true principles of decorative and constructive art; by bringing practical and educated influence to bear on the modes of instruction in schools of design (and in the selection of examples for display in public galleries)."

Mr. Wainwright wanted to know if the articles proposed to be purchased were to be of Birmingham manufacture.

Mr. Tonks explained that the objects of his clause was more especially to provide that articles sent to exhibitions shall effectually represent the trade.

The Chairman thought this matter had better be left to the Committee, who, being practical men, would be best qualified to select jewellery.

Mr. Green said the words in parentheses were really inserted for further discussion, and he moved that they be expunged. He did not think it was part of their business to educate the buyers. Every man, he contended, was the best pioneer of his own business, and they did not want the Association to give them "grandmotherly" advice.

Mr. Payton, in seconding the proposition, said they did not want criticisms of their own work to appear in the Press for the sake of educating buyers. He further contended that this matter was quite out of their line; they had to go to work in a stern, business-like manner, but did not require the Association as a crutch to help them.

Mr. Wainwright also spoke in support of Mr. Green's amendment, and, in the course of his remarks, said he thought the manufacturers were better able to judge of the wants of the public than the Press.

Mr. Banks also thought it would be impracticable to carry out this clause, and instanced the injustice that might be done to one branch of the trade while benefiting another. They had, he said, *fichu* brooches and lockets, and one or other only would be fashionable at the same time; therefore, to recommend to the notice of the public the locket as a fashionable article would be detrimental to the *fichu* brooch maker, and the same would apply to the locket maker if *fichu* brooches were commended. It would be unjust to lead fashion to one branch.

Mr. Tonks counselled them to leave the rules as elastic as possible and have objects wide, as at some time such a clause might be of benefit.

On being put to the vote, this clause was carried with the amendment proposed by Mr. Green.

The next clause, as follows, was passed in its entirety :

"(*b*) To watch all measures brought forward in the Imperial Parliament in any way affecting the interests or position of the trade—whether for the establishment of technical schools; the relations of debtor and creditor; working and trading regulations; the recovery or disposal of stolen property; the working of the Acts relating to pawnbrokers; the detection or punishment of fraud or crime—and to use its best endeavours to have such Acts passed in a form calculated to place the trade on a sound commercial basis."

The Chairman then read the next clause :

"(*c*) To ensure united action in all cases of the failure of persons engaged in the trade to meet liabilities in full; to initiate a distinct line of policy in reference to commercial fraud or reckless trading, and to bring to bear the full weight of its membership to promote a sound and healthy system of trading."

Mr. Wainwright said it appeared to him that this clause was a most important one to the Association; they had considerable difficulty in coping with the law, which was stronger than the strongest man amongst them. When a case of dishonesty was disclosed they were all pretty unanimous on the subject of taking action, but they were not always provided with funds for the purpose; they had a difficulty in finding men who would take up such cases. But if they had an Association, prompt action could be taken to bring a dishonest trader to justice, and if this were done they would not have so many failures.

Mr. Tonks explained that as soon as a failure was announced, the Secretary would send to those concerned, and a meeting would be held at which the Committee would be empowered to take combined action.

Mr. Holmes wanted to know whether the protection would apply to shopkeepers as well as wholesale and manufacturing houses.

The Chairman said the Association would take up the case of any man; his idea was to see the whole of the trade, manufacturing, factoring and retail, combining together.

Mr. Stokes inquired if the subscription would be the same for a factor as a small manufacturer.

Mr. Green said the remarks of Mr. Holmes should be well considered; there must be differences in an Association which covered so much. If the factor were to be protected as well as the manufacturer, they would spend as much money in punishing a man who failed for £300 as it would take to liquidate an estate of £20,000. He personally objected to the factors receiving this protection at the hands of the Association, but would leave it to the Committee.

Mr. Banks thought the clause should be passed in its entirety. It had been shadowed forth that it should cover all, but the title said nothing about retailers; he suggested that they take the beam out of their own eyes before attempting to take the mote out of others. As manufacturers they should attend to their own trade. Let them pass the clause as it stood, and if they wanted to combine afterwards they could do so.

Mr. Basnett agreed that it was best the clause should be passed as it stood, and it could be discussed afterwards. They were all of opinion that fraudulent traders should be punished.

This clause was then passed.

The Chairman then asked for discussion on the following clause :

"(*d*) To secure the detection and punishment of all dishonest and nefarious dealing on the part of workmen and employés ; the more certain and regular prosecution of receivers of stolen property, whether on a large or small scale ; and the development of a system of inquiry and reference, which may tend to secure more reliable work and better service."

This was passed without comment. The following clause was then read :

"(*e*) To assist as far as possible in the establishment of a General Provident Institution among the workpeople and employés in the jewellery and kindred trades, involving support in case of sickness or accident, and insurance in case of death."

Mr. Wainwright, in commenting upon this clause, remarked that as the employés had an Association of their own it would be unwise to set up an opposition one, and he moved that this be not adopted.

Mr. Basnett seconded this amendment, arguing that if they introduced a provident institution they would not have sufficient time to develop the Association.

Mr. B. H. Joseph believed this to be a good object, and explained that, although in many workshops they had provident societies, the workman received no aid when he removed from one workshop to another, all he had paid in contributions being lost.

Mr. Banks most heartily supported the present clause, and said it was pitiful to see the journeymen jewellers so poor ; if they had not acquired the habit of thrift, it would be a kindness to teach them. He averred it would do more good to the Association than anything else to lend a helping hand to the workpeople. This trade had had many wealthy men connected with it, but who had left anything for the working men, who, when their sight or health failed, drifted into the workhouse ?

Mr. Payton said they had left out the decayed masters altogether, and he moved that the same assistance be given to decayed masters as to the employés.

Mr. Tonks seconded this.

Mr. Adie thought this was a matter for the men themselves.

Mr. Green was pained by the last few speeches he had heard. They should, he said, think of the people who laboured for them. There was no trade but the jewellery trade in which they could find men so early in life incapacitated for work—a man's eyesight failed him, or he became unable to follow his trade through continual sitting at the bench—and they would be doing him a kindness by showing him how to become provident ; they had no funds to provide, the men would find the money themselves, and he certainly thought they should have a uniform system by which a workman could rely on aid.

On being put to the vote Mr. Wainwright's amendment was carried, and the clause therefore rejected.

The next clause was, on the motion of Mr. Payton, seconded by Mr. Green, altered to the following :—

"(*f*) To assist in the development of Colonial and Foreign trade in jewellery and personal ornaments, by efforts to secure a Museum or tabulated collection of specimens of the general form and decoration of articles worn in each colony, dependency or foreign country."

Following this came the rule relating to members :

"4.—This Association shall be composed of Manufacturers, of Wholesale and Retail Dealers in Jewellery and personal ornaments in gold, silver or other materials, who shall subscribe a sum of not less than one guinea per annum, payable in advance, and who, after the first enrolment, shall be subject to election at the quarterly meetings of the members."

Mr. Joseph proposed that the words "retail dealers" be struck out. He thought they would have enough to do with the manufacturers, and it would be sufficient to include the manufacturers and factors.

Mr. Wainwright seconded this.

Mr. Payton said this was a most important clause. If they admitted factors for a subscription of one guinea a year, they would lay upon themselves a heavy burden. If the funds were sufficient to carry it out he would then have no objection, but he did not think one guinea would be sufficient for a man who had customers in the three kingdoms. The very travelling expenses to Inverness would swallow up the subscriptions, and he was convinced that if they prosecuted traders from John o' Groat's to Land's End they could not do it for a guinea a year.

Mr. Hyde did not see how it could be practicable for factors and manufacturers to work together. He would rather have an Association entirely confined to manufacturers.

Mr. Joseph said it would be difficult to draw a line between wholesale and manufacturing houses.

Mr. Freeman wanted to know how many shopkeepers to one factor were wound up in a year. This Association would be formed to punish people whom the manufacturer had nothing to do with.

Mr. Green was also of opinion that none but manufacturers should be members.

Mr. Basnett said that by keeping the factor they would keep themselves, and thought if they commenced to draw a hard and fast line differences would arise. He quite agreed that the retailer should not be admitted ; it was a question whether or not they should support the honest factor. He thought an effort should be made to join London with Birmingham, and if they could work with the watchmakers of Coventry, they would get a stronger combination.

Mr. Tonks thought it would meet the matter if they had an increased subscription for wholesale jewellers.

Mr. Banks said it must be an association of manufacturers.

Mr. Payton was pleased with the suggestion that watchmakers be admitted ; he had known many cases where watchmaking firms held a number of proxies at creditors' meetings, and in large failures they would often have the power to paralyse the action of the Association. As regards the factors, he thought they had best have confidence in them—"better let them in at the front door than the back," said the speaker.

Mr. Banks proposed that wholesale jewellers be not admitted, but found no seconder.

The Chairman said one of the objects of the meeting was to take away the petty jealousies existing between manufacturers and factors, and if they would only bind themselves together they would become a much stronger body. Jealousy, he contended, had done much harm in the trade. He then put the clause to the meeting with alterations as proposed by Mr. Joseph, that "retail dealers" be omitted and "watch manufacturers" added, and it was duly passed.

The other Rules, as under, were passed without much discussion.

"(*a*) The minimum subscription of One Guinea per annum shall entitle a Member to one vote.

"(*b*) A Firm or Company may be admitted to Membership as represented by one Member of such Firm or Company, for every Guinea subscribed, such Member's name, as representing the Firm or Company, being entered on the Books of this Association, and none other shall be eligible to attend, to speak or vote at Meetings on behalf of such Firm or Company.

"(*c*) Any Member failing to pay his subscription, after having been applied for, within three months of its falling due, or becoming bankrupt, or making any arrangements with his creditors, involving the payment of less than twenty shillings in the pound, or divulging to persons, not Members of this Association, any confidential reports or other information from time to time supplied him by the Committee, he shall, *ipso facto*, cease to be a Member ; and, on the discovery thereof, his rights of Membership shall forthwith determine.

"(*d*) The Committee may, by a resolution passed by a majority of two-thirds of the Members present at any given Meeting, expel any Member (including any Firm or Company), providing a notice of motion to that effect has been sent to each Member of the Committee, with the notice calling such Meeting. Provided always that any Member so expelled shall have the right of appeal to the

next Quarterly General Meeting of Members to reverse such decision, on giving notice to the Secretary fourteen days previous to the date of such Meeting.

MEETINGS.

"5.—General Meetings of the Association shall be held four times in each year—in the months of January, April, July and October, or as near thereto as in the discretion of the Committee for the time being may be convenient. The Meeting in January shall be the Annual Meeting, at which reports shall be presented, officers elected, and the course of action for the ensuing year decided on. At these Meetings twelve shall form a quorum. Ten days' previous notice shall be given of each Meeting, and the subjects to be brought forward shall be stated on the notice calling such Meeting. No other subject shall be brought forward, except by permission of the Meeting, to be granted by a show of hands, but any resolution arrived at in such case must be confirmed, after due notice, at a future General Meeting.

"(*a*) A Special General Meeting of Members shall be called by the Secretary, on receipt of a requisition signed by at least twenty Members of this Association, the date of such Special Meeting to be fixed by the Committee at its next Ordinary Meeting following such notice, unless, in the opinion of the Chairman, the subject of such Special Meeting is urgent, when the Emergency Committee shall have power to fix the date.

"(*b*) At all General Meetings, questions shall be decided by a show of hands, except when a ballot shall be demanded by at least five Members present. It shall be in the discretion of the Chairman to take a vote by ballot at once, or to adjourn the Meeting for a period not exceeding seven days for the purpose.

"(*c*) The Chairman of the Association, if present, shall preside at each General Meeting; if absent, the Vice-Chairman shall preside, and in case of his absence, a Chairman shall be elected by a majority of the Members present.

"6.—Ordinary Meetings of Committee shall be held monthly, at such times and places as may from time to time be decided on by the Committee itself, and Special Meetings by resolution of the Committee. An Ordinary Meeting may, however, be omitted at the discretion of the Committee, expressed by resolution at a previous Meeting. Five Members and ex-officio Members shall form a quorum.

"7.—Meetings of the Emergency Committee shall be held at twelve hours' notice from the Secretary or Honorary Secretary, as may be most convenient. That it shall be the duty of the Secretary, on hearing of a failure, to call a Meeting of those interested and report same to the Committee.

OFFICERS.

"8.—The officers of this Association shall consist of a Chairman, who shall also be Chairman of Committee; a Vice-Chairman; a Treasurer; Honorary Secretary; Secretary; and Auditor. All these officers, except the Secretary, shall be ex-officio Members of Committee. These officers shall be elected for one year only, but shall be eligible for re-election at the Annual General Meeting.

"(*a*) The Chairman shall have the right to preside at all General Meetings during his year of office, and shall have a casting vote, in addition to his original vote, in case of equality of voting.

"(*b*) The Vice-Chairman shall have the right of presiding at all Meetings in the absence of the Chairman for the time being. In case of equality of voting, he shall also have a casting vote, in addition to his original vote on the same question.

"(*c*) The Treasurer of the Association shall keep a separate banking account, and accounts of all receipts and disbursements, in books provided for the purpose, and shall present to the Annual General Meeting a detailed statement, made up to December 31 last, duly audited, and previously accepted by the Committee.

"(*d*) The Honorary Secretary shall conduct all correspondence, and generally direct and superintend the salaried Secretary in the keeping of Minute Books, pursuit of inquiries, tabulation of statistics, and all other work usually pertaining to the office of Secretary, in accordance with the resolutions of the Committee.

"(*e*) The Auditor shall go over the accounts of the Association, and if correct, vouch for the same previous to each Annual Meeting.

COMMITTEE.

"(9).—The Committee shall consist of the above specified officers of the Association, and ten other Members, five of whom shall retire by rotation, but who shall be eligible for re-election at the Annual General Meeting. The Committee shall appoint five of its number to form an Emergency Committee.

"The Committee shall carry on the business of this Association, and, guided by the resolutions from time to time passed by General Meetings of the Members, shall be empowered to carry out the objects specified in these Rules. They may fill up any vacancy caused by the death, resignation or ceasing to be a Member of the Association, of any one or more of their Members. They shall also fill up any vacancy, so caused as above, in the list of officers of the Association, and may provisionally decide any question not otherwise provided for in these Rules. They shall have power to elect and fix the rate of salary, and to limit or extend the duties of the Secretary or any other paid officer of this Association whom they may see fit to appoint. They may also, if they deem it necessary, remove any such paid officer by a resolution of two-thirds in number of those present at any Meeting, at which due notice of such action shall be given. And, providing that no action taken is in contravention of the Rules in force for the time being, or of any previous resolution of the Association then still remaining in force, no Member of the Committee shall incur personal responsibility for any act done on behalf of this Association.

RULES.

"(10).—No alteration of or addition to these Rules shall be valid, except it be supported by a vote of two-thirds of the Members present at a General Meeting, given after due notice as aforesaid."

THE ELECTION OF OFFICERS.

The CHAIRMAN thought it would be as well to leave this until they had an Association formed, so that they could be elected by the members.

Mr. BASNETT proposed that the present Committee form a Committee *pro tem.* for carrying out the work: seconded by Mr. Wainwright.

A vote of thanks to the Chairman closed the proceedings.

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GOLD melts at about 2,016° to 2,190° Fahr., according to different authorities. It is neither affected by water nor air at any temperature, and is not attacked by ordinary acids. It is the most malleable of all the metals, and may be beaten into sheets of surpassingly wonderful thinness. Its very great malleability renders it unfit for use for jewellery or for coinage until its hardness, and consequent durability, are increased by alloying it with silver or copper. Exposed to the heat of the oxy-hydrogen blowpipe, it is known to be vaporised; and it was formerly supposed that it was not volatile at lower temperatures; but the researches of Napier and Makins show that volatilisation occurs at temperatures of an ordinary muffle furnace when alloys of silver and gold are cupelled with lead. An analysis of deposits taken from the chimney of a small reverberatory furnace, in daily use for cupelling gold for months, showed 14 per cent. of silver and 7·1 grains of gold for every eight ounces of silver. Still, after the destruction of a quantity of jewellery by a fire, a great proportion of the gold should be recoverable, since but a small quantity, if any, would be volatilised; and the metal is not at all affected by air or water, as before remarked.

# American Items.

THE Elgin National Watch Co. is so busy at the present time, that it can with difficulty fill its orders. Manager Cutter reports that jobbers are eagerly taking goods even without orders, and that things are so strained at the factory that they are unable, in spite of their constantly increasing facilities, to keep pace with the demand.

MR. A. LYONS, 36, Maiden Lane, New York, has obtained the American agency of Messrs. Borgzinner Brothers, of London, England, manufacturers of watch and jewellery cases, in reference to which the *Jewelers' Weekly* says: The firm could hardly have made a happier selection, as Mr. Lyons, with his long experience in the trade and his hosts of friends, cannot fail to handle its interests here successfully.

A UNIQUE watch fob worn by a young society man, who is visiting friends in St. Louis, is a live turtle about an inch long, which is attached to his watch chain by a gold ring. The turtle was caught about five months ago by the young man in Lake Winnebago, and is released each day for a banquet of flies and a swim in a bowl of filtered water.

THE report of Messrs. George F. Kunz and J. S. Diller, who were sent by the Director of the United States' Geological Survey to make an examination of the reputed diamond fields in Kentucky, furnishes considerable food for speculation. Although the carbonaceous shale of the Kentucky field contains only ·681 per cent. of carbon to nearly 38 per cent. of the same element in the Kimberley shale, it is thought that the remarkable similarity of the peridotite and the residuary deposits, which so closely resemble the diamondiferous material of the South African mines, hold out a strong prospect that patient and diligent search may yet result in the discovery of diamonds in paying quantities.

THE *New York Herald* has published a series of interviews with representative business men, giving in full their views of the business outlook. The opinions expressed are, without exception, of a hopeful character. Though a good trade was done by a majority of the houses last year, they judge, from the volume of 1887's business so far transacted, that this year will be even more prosperous. With its usual good sense, says the *Jewelers' Weekly*, the *Herald* devotes more space to jewellery than to any other branch, and publishes interviews with several of the leading American firms, all of whom express themselves as satisfied with the spring trade and the substantial promise it holds forth of an exceptionally prosperous fall season. Commenting editorially upon the various views which it publishes, the *Herald* says: Trade is not booming just now, but is on a solid basis of enduring prosperity. There have been few periods when the affairs of the country were so evenly adjusted as they are at present, and when the talents and energies of the people were so exclusively given to production and to development of natural resources.

IT has gotten to be a chestnut, says the *Jewelers' Circular*, for a man to speak of the "prospects" for the fall trade; and yet a careful look at the present condition of things shows trade to be in a remarkably active and healthy condition, and extensive preparations are being made on all hands for a large fall trade. This is most noticeable at the fancy goods dealers' and dealers in kindred lines, possibly because of their wares being kept in sight upon shelves and tables; and the quantity of novelties for the fall is truly astonishing. It does not seem that the buyers for these houses have used sufficient caution in purchasing such large stocks, but when spoken to they speak most confidently of their ability to dispose of them. In jewellery a brisk demand is noticeable for all classes of goods. Manufacturers of all kinds of gold, silver and plated goods have made up an imposing variety of patterns for this season, and have made them in large quantities. The jobbers are not buying largely, so they say, but they are still buying more than in previous years. The best sign of all, however, is that retail dealers are exercising more caution in buying. They are buying many goods, it is true, but not more than they are able to dispose of. Goods are moving fast, and the coming autumn months will tell whether the strong indications for good business have had any foundation under them.

# Electro Deposition of Iridium.

IN a patent recently issued by the United States Patent Office to Mr. William L. Dudley, the inventor describes a process of depositing iridium, by means of which a bright, flexible reguline deposit is obtained. The inventor uses either aqueous solution of the double chloride or iridium and sodium, or of the double chloride of iridium and ammonium, containing about two ounces of metallic iridium to the gallon, and acidified with about half an ounce of sulphuric acid to the gallon. The solution of the double chloride of iridium and sodium is prepared as follows: The hydrate of iridium is dissolved in the least possible quantity of hydrochloric acid and evaporated in a water bath to expel the excess of acid. The residue is then dissolved in water and an amount of sodium chloride is added sufficient to combine with all of the chloride of iridium present to form the double salt. The solution is then diluted to the required amount, so as to contain about two ounces of metal to each gallon of liquid. The required amount of sulphuric acid is then added and the solution is ready for the electro deposition.

The solution of the double chloride of iridium and ammonium is prepared as follows: The hydrate of iridium is dissolved in the least possible quantity of hydrochloric acid and carefully neutralised with ammonium hydrate. It is then acidulated with sulphuric acid until all of the precipitate produced by the ammonium hydrate is dissolved, and finally diluted with water until each gallon of the liquid contains about two ounces of the metal. The solution is then ready for work when acidified, as before mentioned. From both of these solutions Mr. Dudley obtained a thick, bright and reguline deposit of iridium; and he has found that a plate of iridium or phosphide of iridium, as made by the Holland process, if used as an anode, will dissolve in these solutions while the current is passing. As in electro-plating with other metals, it is essential, to obtain good results, that the articles to be plated should be perfectly clean. A brighter and smoother deposit is obtained if the articles are highly polished before they are introduced into the iridium bath. In plating articles which are readily attacked by the solution, it is of course desirable to first coat them with some metal not appreciably affected by such solutions.

In the deposition of iridium from any of its solutions it is necessary to avoid battery power of too great intensity; and in case the intensity be too great, it can be recognised by the deposit becoming dark and powdery, and also by an excessive evolution of gas from the surface of the anode and cathode. In managing the solution, alkalinity should be avoided, although neutral solutions may be employed; but acid solutions are to be preferred. During deposition, where a thick deposit is required, it may be found necessary to remove the articles from the solution from time to time, and to wipe them in case the deposit should have a tendency to become black; but this blackness may be avoided, by proper manipulation of the solution and battery power, and also by proper cleansing of the articles. It is also found that when the articles to be plated are kept in gentle motion during deposition, the deposit will take place faster and be brighter and thicker than if they are allowed to remain stationary. Mr. Dudley does not claim, however, that the plating produced by his process will resist the action of acids which will dissolve finely divided iridium.

## Electro Gilding Watches.

In reply to a correspondent of the *Deutsche Uhrmacher Zeitung*, Mr. Behrends says that the ill-success in gold plating is generally due to circumstances so trifling that they are apt to be overlooked, and for this reason it is often difficult to find the offending cause that occasioned the trouble; but still more difficult is it to specify it without a personal examination of all the single parts.

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

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

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

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

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

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

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

There is another probability: that your bath contains either too much or too little cyanide. All these defects can be ascertained only on examination, and corrected by adding one or the other of the components wanted.

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

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

## East Indian Jewellery.

Among Signor Castellani's collection of antiquities, numerous examples occur which bring one back to the lost art of making Etruscan jewellery. It is believed that valuable hints of how the ancient goldworkers operated may be gathered from the itinerant goldsmiths of the East Indies. These craftsmen carry their tools with them in their wanderings, and, where employment can be found, transform coins and bits of metal into filigree ornaments resembling the antique, whilst still following their natural style. *L'Union Horlogere* has the following regarding the tools and manner of working of these artists: "A low earthern pot full of chaff or sawdust, on which he makes a little charcoal fire, a small bamboo blow-pipe about six inches long, with which he excites the fire, a short earthern tube or nozzle, the extremity of which is placed at the bottom of the fire, and through which the artist directs the blast of the blow-pipe, two or three crucibles made of the fine clay of ant-hills, a pair of tongs, an anvil, two or three small hammers, a file, and, to conclude the list, a few small bars of iron and brass about two inches long, differently pointed, for different kinds of work. It is astonishing what an intense little fire, more than sufficiently strong to melt silver and gold, can be kindled in a few minutes in the way just described. Such a simple portable forge deserves to be better known. It is, perhaps, even deserving the attention of the scientific experimenter, and may be useful to him when he wishes to excite a small fire, larger than can be produced by a common blow-pipe, and where he has not a forge at command. The success of this little forge, it may be necessary to state, depends a good deal on the bed of the fire being composed of combustible materials, and a very bad conductor of heat. The smiths at Ceylon use a composition as a hone for sharpening knives and cutting instruments that is worth noticing. It is made of the capitia resin and of corundum. The corundum, in a state of impalpable powder, is mixed with the resin rendered liquid by heat and well incorporated. The mixture is poured into a wooden mould, and its surface levelled and smoothed while it is hot, for when cold it is extremely hard. It is much valued by the natives and preferred by them to the best of our hones.

Mother-o'-Pearl.—In the western suburbs of Vienna flourishes an industry which as a general rule does not attract much public attention, although it is of some importance. This is the manufacture of articles and ornaments where mother-o'-pearl is used. Attention has lately been drawn to this industry, owing to the breaking out of a strike amongst those engaged in it. The value of the crude mother-o'-pearl which is annually consumed in the district is, according to the Vienna correspondent of *Industries*, 3,600,000 fl. (about £300,000), whilst the value of exported articles is 8,000,000 fl. (about £670,000). In the latter figure are not included the articles which are sold in the home market, so that, making an allowance for this item, the annual value of mother-o'-pearl articles produced in the neighbourhood of Vienna may be set down at about £1,000,000 sterling, showing that this industry is one of considerable importance.

## The Effect of Centrifugal Force on the Balance.

MR. KULLBERG, being of opinion that the effect of centrifugal force on the isochronous vibrations of a chronometer balance were greater than generally supposed, and being desirous of having the fact tested by an independent authority, applied to the Astronomer-Royal, who granted permission to send a chronometer to the Royal Observatory, and undertook to rate it.

The chronometer, an ordinary large two-day, was deposited at the Observatory on April 18, and with it were left four balances, described below. The balances were practically of the same diameter, but of different elasticity.

1. A plain brass balance, *not cut*, with four quarter timing screws; thickness of rim, 0·085 inch.

2. An ordinary compensation balance, two timing screws, and two compensation weights. Thickness of rim, 0·038 inch; length of acting laminæ, 135° from point of fixture or bar; distance of centre of compensation weight, 98° from bar.

3. A steel balance with brass inlaid, two timing screws, two compensation weights. Thickness of rim, 0·035 inch; length of acting laminæ, 141° from point of fixture at the bar; half the laminæ on each side compensated next to bar; distance of centre of compensation weight, 100° from bar.

4. Same as No. 3, but with laminæ 0·024 inch thick; acting length of laminæ, 150°; two small screws at ends of acting laminæ, each weighing three grains; distance of centre of compensation weight, 61° from bar.

The balances in large arcs made one turn and a fifth, and in short arcs three-quarters of a turn. The last three balances were accurately adjusted for temperature, and as the variations of temperature were so small, it can be assumed that the rates are unaffected by temperature.

When balance No. 1 was fitted, the chronometer was placed in the oven at an even temperature. Below are the daily rates:—

Balance No. 1.

| Long Arcs | Temperature | Short Arcs | Temperature |
|---|---|---|---|
| —166·4 | 88·9 | —172·1 | 90·5 |
| —165·7 | 88·9 | —177·3 | 90·4 |
| —166·0 | 90·4 | —176·5 | 90·6 |
| —167·4 | 90·5 | —172·0 | 90·4 |

Balance No. 2.

| | | | |
|---|---|---|---|
| +0·7 | 54·6 | +2·5 | 53·0 |
| +0·5 | 54·6 | +2·4 | 52·0 |
| +0·3 | 56·0 | +2·0 | 51·2 |
| +0·5 | 55·8 | +3·4 | 52·2 |
| +0·4 | 56·5 | +2·8 | 51·4 |
| +0·3 | 55·8 | +2·8 | 50·8 |
| +0·2 | 56·4 | +2·5 | 54·1 |

Balance No. 3.

| | | | |
|---|---|---|---|
| +6·5 | 54·7 | +21·3 | 54·4 |
| +6·7 | 54·2 | +21·4 | 54·0 |
| +6·7 | 55·7 | +21·4 | 52·5 |
| +5·4 | 55·8 | +21·9 | 53·6 |
| +6·2 | 55·4 | +21·6 | 54·5 |
| +6·0 | 55·6 | +22·0 | 54·8 |
| +5·6 | 56·0 | +21·4 | 55·9 |

Balance No. 4.

| | | | |
|---|---|---|---|
| +9·2 | 59·0 | +41·5 | 55·4 |
| +10·7 | 58·0 | +40·2 | 56·0 |
| +8·2 | 62·4 | +40·2 | 56·0 |
| +8·0 | 62·4 | +39·4 | 57·7 |
| +7·8 | 62·8 | +39·0 | 59·5 |
| +10·8 | 63·7 | +38·0 | 59·8 |
| +10·7 | 65·0 | +40·4 | 60·0 |

Mean Daily Rates.

| | Long Arcs | Short Arcs |
|---|---|---|
| Balance 1. | —166·4 | —174·5 |
| ,, 2. | +0·5 | +2·6 |
| ,, 3. | +6·1 | +21·6 |
| ,, 4. | +9·3 | +39·7 |

Mr. Kullberg thinks had balance No. 4 had its rim compensated at the free end of the rim, instead of, as now, next to the point of fixture or bar, the compensation weights would have been at the extreme end, and the chronometer would probably have gained *about* 40 seconds more in short than in long arcs, without any change whatever in the balance spring or escapement.

The chronometer from which the above results were obtained was exhibited in the Paris Exhibition, 1878, and Mr. Kullberg's experience of theoretical springs and centrifugal force laid before the jury, of which M. Saunier was president.

## The Merchandise Marks Act, 1887.

THE following circular is being sent round the trade by the London Watchmakers' Trade Association:—

"42, Spencer Street, Clerkenwell, E.C.,
"*September*, 1887.

"Dear Sir,—I am instructed by the Committee of the above Association to call your earnest attention to the 'Merchandise Marks Act,' 50 and 51 Vic., cap. 28, recently become law, and which makes offences punishable by fine or imprisonment the selling of foreign watches as English, or the selling of foreign movements in English Hall-marked cases, or if any marks or words be on the case or movement which are liable to deceive as to place of origin, unless at the time of sale a statement to such effect be given in writing to the customer (it not being necessary for the customer to ask for the same).

"We would particularly call your notice to Clauses 7, 8 and 17, although the whole of the Act ought to be carefully studied. Copies of the Act can be obtained of Messrs. Eyre and Spottiswoode, East Harding Street, Fleet Street, or through any bookseller, or of this Association (in which case the charge is 4d., to cover postage, &c.).

"The reason we beg to impress the above upon the attention of all shopkeepers is that they may have in stock watches purchased of some manufacturers (Clerkenwell, Coventry or otherwise) that are part Swiss work, and which they (the shopkeepers) have bought as legitimate English work. They should therefore see to this directly, as this Association considers it its duty to enforce the Act, and give prosecutors every assistance possible, in the shape of experts' evidence, &c., to ensure conviction.

"I am, dear Sir, yours respectfully,
"J. T. Newman, *Secretary*."

We published in our August issue the clauses as then amended referring to watches, but as they have since received some further slight modifications, we herewith republish them as they are now the law, together with Section 17, to which attention is drawn in the above circular, and Section 18, which is of general interest to manufacturers. The words printed in italics are the additions referred to.

7. Where a watch case has thereon any words or marks which constitute, or are by common repute considered as constituting, a description of the country in which the watch was made, those words or marks shall *primâ facie* be deemed to be a description of that country within the meaning of this Act; and the provisions of this Act with respect to goods to which a false trade description has been applied, and with respect to selling or exposing for or having in possession for sale, or any purpose of trade or manufacture, goods with a false trade description, shall apply accordingly; *and for the purposes of this section the expression "watch" means all that portion of a watch which is not the watch case.*

8. (1.) Every person who *after the date fixed by Order in Council* sends or brings a watch case, whether imported or not, to any assay office in the United Kingdom for the purpose of being assayed, stamped or marked, shall make a declaration declaring in what country or place the case was made. If it appears by such declaration that the watch case was made in some country or place out of the United Kingdom, the assay office shall place on the case such a mark (differing from the mark placed by the office on a watch case made in the United Kingdom) and in such a mode as may be from time to time directed by Order in Council.

(2.) The declaration may be made before an officer of an assay office, appointed in that behalf by the office (which officer is hereby authorised to administer such a declaration), or before a justice of the peace, or a commissioner having power to administer oaths in the Supreme Court of Judicature in England or Ireland, or in the Court of Session in Scotland, and shall be in such form as may be from time to time directed by Order in Council.

(3.) Every person who makes a false declaration for the purposes of this section shall be liable, on conviction on indictment, to the penalties

of perjury, and on summary conviction to a fine not exceeding twenty pounds for each offence.

17. On the sale or in the contract for the sale of any goods to which a trade mark, or mark, or trade description has been applied, the vendor shall be deemed to warrant that the mark is a genuine trade mark and not forged or falsely applied, or that the trade description is not a false trade description within the meaning of this Act, unless the contrary is expressed in some writing signed by or on behalf of the vendor and delivered at the time of the sale or contract to and accepted by the vendee.

18. Where, at the passing of this Act, a trade description is lawfully and generally applied to goods of a particular class, or manufactured by a particular method, to indicate the particular class or method of manufacture of such goods, the provisions of this Act with respect to false trade descriptions shall not apply to such trade description when so applied: Provided that where such trade description includes the name of a place or country, and is calculated to mislead as to the place or country where the goods to which it is applied were actually made or produced, and the goods are not actually made or produced in that place or country, this section shall not apply unless there is added to the trade description, immediately before or after the name of that place or country, in an equally conspicuous manner, with that name, the name of the place or country in which the goods were actually made or produced, with a statement that they were made or produced there.

## The Ruby Mines of Burmah.

In an interesting communication to *Murray's Magazine* Mr. Streeter says the above mines are of three distinct kinds. The metamorphic or gneiss rock furnishes the first, and probably in the near future the most important, of these. Huge fissures traverse its mass in all directions, caused by shrinkage in long past ages, and these fissures have been filled, probably at an early stage of transformation, with a soft reddish and blackish clayey earth, generally containing rubies. These have escaped much of the water-wearing process to which the stones in the lower valley appear to have been subjected, and it is reported that some of the best gems have been found in such fissures. These crevices are called by the Burmese "Loos" or caves; they work them in a most superficial manner, simply following the veins of soft earth between the walls of rock as far as practicable, or until they are stopped by poisonous gas. The earth is extracted and washed by hand in small round flat trays of bamboo basket-work. The most remarkable example of this system of mining is found on the Pingoo-Doung, or Pagoda Hill, near Kiapien, a huge black mass of rock rising high above the valley and carrying ruby-bearing earth both in its fissures and flanks. On its summit a gilt pagoda has been erected which forms a landmark for miles round, sparkling in the sun above its less favoured neighbours. The workings on it are of a dangerous character, and fifteen miners were killed a little while ago by a landslip. The second variety of mines is found on the sides of these rocky hills, where diversified strata of a red and white clayey consistency have been upheaved. The earth contains masses of harder material, undergoing rapid disintegration wherever exposed to the action of the air; some of it is almost as light as pumice stone and other portions nearly as hard as granite. The original material from which this red and white clayey stuff has proceeded is believed to be the matrix of the corundum which furnishes the ruby and sapphire in their now existing state. But repeated transformations must have been undergone since the formation of the original rock, during which selections and distributions of the valuable stone have occurred; for although the natives say that such stones may be found throughout almost the entire mass of this reddish earth, yet only certain places have been systematically worked for them. This is done by a simple system of hydraulic mining on a small scale. Water is brought in an open conduit from the side of the hill in channels, never more than 18 in. square, and delivered with very little pressure. The water is employed to wash the earth, generally along a natural channel, to the lowest part of the working, and at night is diverted into bamboo pipes which throw a spray on to different sides of the excavation. The earth thus softened is dug out in the morning by hand, usually with tools like gardeners' spuds, and then washed in the stream. Thus the whole of a hillside is slowly eaten away and its rubies extracted. The third and last system of mining employed is by sinking pits in the lower or plain parts of the valleys. The ruby strata here are of a different character, and a final process of discrimination appears to have distributed pockets of ruby-bearing earth under the entire area of the flat land in the different valleys. The earth is called by the natives "Byun," and is generally found at two different depths: the first layer at about 4 ft., and the second and richer one, at 20 to 30 ft. below the surface. It is generally extracted by a company of miners, ten or twelve in number. Pits are dug about 8 ft. square, lined with rough timber and stayed with four cross-pieces at intervals. Water enters the pit on sinking a short distance below the surface, and the principal work and source of expense is keeping the mine free from water. Upright posts are let into the ground at a short distance from the mouth and a fork is cut in the upper end of each. In this fork is balanced a lever, the longer arm of which hangs over the pit, while the shorter arm carries a bucket weighted with stones to counterbalance the contents of the basket, which is connected with the longer arm by a bamboo which reaches to the bottom of the pit. This contrivance forms a most efficient though simple means of raising both water and earth by manual labour. Generally six or eight of these levers overhang each pit in actual working, and probably the proportion of water buckets in constant use to earth baskets is two to one. Three men at least are below, occupied in filling both baskets and buckets; they rise and fall incessantly during the working hours, which rarely exceed six daily. The ruby earth thus extracted is placed in a heap at the side of the pit, and on first exposure, while wet, sparkles in the sun with myriads of small stones, brilliant in colour but not large enough, unfortunately, to be of any value. When a sufficient quantity has been obtained it is washed in bamboo trays and handed over to the sorters, who, after carefully examining it, and taking out any stones of value, pass it on again to a small colony of women and children who generally surround every pit, and who again sort it slowly over in the hopes of finding some smaller stones that may have been missed by the men. It is a ludicrous sight to see two or three little children who, perhaps, can scarcely walk, sitting down before a heap of this washed earth and sorting away with most serious faces, as if they realised that their existence depended upon their exertions. No machinery is apparent in the whole district, though it is stated that a pump was brought up a few years ago from Mandalay; but it soon got choked, and was thrown away as useless, probably because no one understood how to work it. These gangs of miners are presided over by a "Gyoung" or head-man, and they appear to work on a co-operative system, the result of their labour being divided according to merit. Some curious superstitions exist among them, and they are great believers in dreams. No miner will dare mention or talk about an elephant, tiger or monkey while at work; and lately they greatly feared that a few elephants, belonging to the commissariat department, which came down near the mines to feed, would frighten away all the rubies in the district. It is also thought that, if a man secretes a stone found while working at the diggings, he will sooner or later meet with some great misfortune and probably die some horrid death. This, however, does not prevent smuggling being carried on to a great extent, though the Burmese kings have resorted to many expedients in order to stop it. One Lord of the White Elephant had all the ruby earth brought down to his palace and washed and sorted there by his numerous wives under a guard. In the late King Min-dohn-Min's reign, any smuggler or illicit dealer in rubies was publicly flogged at the street corners of the town and all his property confiscated. The expedients for passing rubies through the King's guards that were stationed at different places on the road between the mines and Mandalay were surprising in their variety. Some of the miners or traders would make flesh wounds in their arms and legs and place rubies in the different cuts. These would heal over and completely hide the gem beneath, which might be extracted when occasion served. Others would place packets of stones in the top-knots of their hair or would carry them in small hollow bamboos with false bottoms. These devices must have been often successful, for numerous valuable stones reached Rangoon yearly from unknown sources.

## Fashions in Jewellery.

THAT a revival in the direction of an increased taste for personal adornment in the way of jewellery is taking place in fashionable society has been evident for some time. As this change of taste on the part of the leaders of our own *beau* (or rather *belle*) *monde* is likely to be more lasting than arbitrary changes of fashion usually are, it should afford hope that the jewellery trade may be raised from the slough of despond into which it has fallen. Any indications that the fashion referred to is not purely local or confined to any one circle, tend to strengthen the idea as to its enduring. Although the sale of the French Crown Jewels has had the usual fate of a nine days' wonder, there are not wanting signs that French feminine inclination for jewellery has in no way declined; and that our Trans-Atlantic cousins are following the European lead is shown by numerous articles on the subject in American papers.

An excerpt from a leader in the *Jeweler's Circular* will be of special interest just now, as showing what is being done by the jewellery trade to keep the matter of personal adornment abreast of the times.

While marked progress is being made in literature, science, the arts, &c., and the human race becoming more appreciative each day of all that is beautiful either in nature or art, it is but reasonable to suppose that an industry that is devoted to the production of articles of luxury, and in which so many millions are invested, should contribute its full share to the progress of the age. In no branch of artistic work has there been greater advancement than is manifest in the productions of the gold and silver smiths. All the other arts and sciences have been made tributary to these produetions, and whatever of progress has been developed in painting, sculpture, &e., may also be found in the modern examples of the handicraft of the gold and silver smiths. This has been abundantly demonstrated in the recent sales of the collections of some of our wealthiest citizens, whose death made necessary the dispersion of their art collections which they had spent their lives in collecting. At the sales of these famous collections, no articles offered attracted more attention than the examples of art work in gold and silver. The cabinets containing these were surrounded at all times by admiring throngs, whose admiration extended not only to the artistie ideas embodied in the works before them, but to the workmanship as well, and the highest encomiums were lavished upon the skill that had wrought out in the precious metals the beautiful coneeptions of the artists who designed these masterpieces. At the sales these works of art and of value brought liberal prices, and the competition for them was very great, showing that there is a wide and growing appreciation of artistic work of this kind. That such is the fact is demonstrated by a visit to the salerooms of the leading manufacturers, where will be found exhibited a profusion of gold and silver work in the greatest varieties of design and patterns that have ever been exhibited anywhere at any time. These productions are in response to a demand that is constantly increasing as the country grows in wealth, and the number of persons who can afford to gratify their longings for the beautiful multiplies with such rapidity as it does in this country. Our manufacturers are stimulated to renewed effort by the demand, and vie with each other in the beauty and elaborateness of their productions. The mere fact that these beautiful and costly works are produced is all the evidence that is required that the demand for them not only exists but is increasing, for our shrewd manufacturers are too good business men to put their money and their time into work that is not likely to be remunerative. If there was no market for them there would be no goods, whereas the fact is that there never was such a profusion of fine goods, embodying the highest artistic ideas, as there is at present. These goods take on all forms that are known to the jewellery trade, from elaborate pièces that are cherished simply for their artistic beauty to the most utilitarian articles of every-day use.

What is true of the demand for the best examples of the gold and silver smith's art, is true, also, as regards those examples of the jeweller's art designed for personal adornment. There was a time, a few years ago, when fashion, in its fickleness, decreed that gold jewellery should not be worn to any great extent; but even fashion could not enforce this decree fully, for each individual will insist upon following his or her own tastes in such matters and wear such things as are appropriate and becoming. There are few ladies who do not realise that jewellery, that is in itself beautiful, adds to their attractiveness when displayed with judgment, and hence jewellery has always been fashionable, in spite of all efforts to taboo it, since it was first invented. At times it has been less conspicuous than at others, but never has it been regarded as in bad taste when exhibited with judgment. One may be bejewelled to excess and so appear ridiculous, as another may be dressed in bad taste; but dresses are nevertheless demanded, and so is jewellery. But Dame Fashion has recalled her decree against jewellery, and those devotees who formerly wore but little or none, do not now feel that they are dressed unless they are adorned with certain articles of jewellery, the kind and amount varying with individual tastes. Necklaces, brooches, earrings, finger rings, lace pins, pins for the hair and for the bonnet, cuffs buttons, &c., are worn on all occasions, and our lady contributor, "Elsie Bee," is our authority for the statement that even the garters worn by ladies are ornamented with gold, silver and gems. Of this we have no personal knowledge, although we remember having seen in the stores some very beautiful articles which we supposed to be bracelets of novel design until our fair contributor awakened our suspicions in the matter. But we can testify positively to the fact that the other articles we have mentioned are worn freely and openly by ladies at home, at parties, in the street and on all occasions. The poet remarks that "beauty unadorned is adorned the most," but our modern ladies act upon the belief that judicious personal adornment heightens their beauty, and American women the world over are noted for their loveliness. As for the gentlemen, a certain amount of jewellery has become with them a matter of necessity. They must have their collar and cuff buttons, their watch and accompanying vest chain, a handsome scarf pin, studs for full dress, charms for their watch chain, and one or more finger rings and other articles of ornament according to taste. These are worn by everybody, at all times and at all seasons, some of them being absolutely indispensable to full dress occasions.

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A New Dodge.—An attempt, of a somewhat novel character, to extort money from pawnbrokers, has, according to the *Birmingham Daily Mail*, been made within the past few days. The dodge adopted is not exactly new, but it is nevertheless a decidedly ingenious one. Two respectably-dressed men, evidently with a fair knowledge of the jewellery trade, call upon the pawnbrokers, and upon being told that money is advanced on jewellery one of the pair produces either bracelets or scarf pin of a valuable description, and requests an inspection. When the customary acid test has been applied, and the articles found genuine, an extremely high price is asked, which, of course, is refused. The owner declines to accept a smaller sum, so that the pawnbroker has no alternative but to hand back the jewellery. Immediately this is done the owner discovers that the articles have been disfigured, and forthwith accuses the pawnbroker of having filed the gold instead of applying the acid. The confederate, who is waiting in the loan office, declares that he saw the file used, and in his estimation it has depreciated the value of the goods to the extent of two sovereigns. The unsuspecting broker then begins to perceive that he is dealing with swindlers, and finds himself in an awkward predicament. He is threatened that unless he makes some compensation or purchases the jewellery an action will be brought against him. Knowing that it would be a delicate matter to refute such a charge if the sharpers upon oath say that they witnessed the filing, the pawnbroker in some cases chooses the lesser of two evils, and prefers paying a sovereign rather than run the risk of losing a much greater amount by defending the threatened action. The only way to defeat these rogues would be to apply the acid test in all cases in the presence of two or three witnesses, and with this warning probably pawnbrokers will be on their guard.

# Workshop Memoranda.

NICKEL-PLATED brass or iron, which has become coated with burned grease and dirt, may be cleaned without injury to the nickel surface, by boiling in a strong solution of soda or potash : rinse in water, and rub first with moistened and then with dry rouge or chalk.

Steel which has rusted can be cleaned by brushing with a paste composed of ½ oz. cyanide potassium, ½ oz. Castile soap, 1 oz. whiting, and water sufficient to form a paste. The steel should first be washed in a solution of ½ oz. cyanide potassium in 2 ozs. of water.

To Clean Pearls.—Soak them in hot water, in which bran has been boiled, with a little salts of tartar and alum, rubbing gently between the hands when the water will admit of it. When the water is cold, renew the operation until the discolouration is removed ; rinse in lukewarm water, and lay the pearls in white paper in a dark place to cool and dry.

A Grained Surface on Brass.—The following simplified mode of effecting the graining upon brass, and one which does not require much skill, will be advantageously followed by the watchmaker who is but seldom called upon to perform this work. It is given in *L'Union Horlogere* :—Dissolve a little culinary salt in a mixture of equal parts of nitric and sulphuric acid. This will produce a grained surface upon either brass, copper or German silver. A coarser grain can be obtained by the addition of a little more salt. Before the procedure it should be understood that the articles are to be well ground and thoroughly cleaned. Next they are suspended to a horse hair, and dipped into the said mixture for the space of a few seconds. They are then withdrawn and afterwards dipped into hot water, after which they are scratch brushed with beer, for which operation you can use a brush of brass, German silver, or of glass thread. This being done, the parts are silvered with ease, and again scratch brushed and then gilt. In this manner an equally grained surface of a uniform and desirable colour is obtained.

Two Methods of Demagnetising Watches.—The magnetic influence of dynamo machines on watches is a constant source of annoyance to electricians ; the delicate steel parts, such as the balance wheel and escapement, being so readily affected in their action by the slightest degree of magnetism as to render the watch worse than useless. An apparatus was constructed by Swan for the purpose of demagnetising watches. It consisted of a horse-shoe magnet made to rotate. The damaged watch was placed on a revolving disc turning in the reverse direction to that of the poles of the magnet, and was thus allowed to approach quite close to the magnet, the distance being gradually increased until the watch was entirely removed from the influence of the poles. The repeated alternate passing of the magnet's poles and gradual lessening of distance had the desired effect of demagnetising the steel parts. Hopkinson has invented the following method :—He commences by completely magnetising the watch, not by subjecting it to the influence of a magnet, but by suspending it inside the copper coil of an apparatus, having a commutator which reverses the electric current twice in every second of time, its strength being at the same time gradually diminished until it becomes *nil*. The success of the operation depends upon the reversals of the current and the gradual diminishing of its force being obtained with the utmost regularity ; and to effect this, the apparatus, which is a battery, has to be constructed with the greatest nicety. A windlass, with ratchet wheel, is employed for the slow raising of the zincs out of the solution.

The Glasgow Exhibition.—The building for the International Exhibition at Glasgow, which will be opened in May of next year, is now being proceeded with. The ground to be occupied by the Exhibition buildings extends to 10½ acres, and already the framework of the central hall is being carried forward to completion. The artisans' section is expected to be instructively complete, and an exceptionally interesting exhibition of pictures is being arranged. The Fine Arts Committee have now issued their prospectuses, applicable to the sale and loan sections. The Queen is patron, and the Prince of Wales hon. president. The corresponding members include Mr. L. Alma-Tadema and Mr. Hamo Thornycroft, and the Committee comprises many leading citizens, Sir James King (Lord Provost) being the chairman of the Executive Council. The art section is to include sculpture (original works in marble, bronzes, &c., terra cotta, wax and plaster of Paris), oil paintings, water-colour drawings, works in black and white (charcoal, crayon and sepia drawings, &c.), engravings and etchings (steel and copper engravings, lithographs, &c.), architectural drawings and models, and objects illustrative of Scottish history and archæology. The art galleries are to be ten in number, occupying an area equal to 3,200 square yards, and affording about 2,450 lineal feet of hanging space. It is proposed that objects illustrative of Scottish history and archæology shall be placed in a separate building, specially constructed for that purpose. Electric light will be used throughout the Exhibition, and the mode of its application in the fine art galleries will obviate the risks incidental, under other conditions, to the use of artificial lights. An art union is to be organised in connection with the fine arts sale section. The price of tickets will be limited to 1s. each, and the receipts are to be divided into prizes to be selected from works exhibited in the fine arts sale section. In connection with the Loan Exhibition, the Committee undertake to collect and return the works of art and other exhibits lent, and to bear all cost of transit. When required to do so, they will insure, at their own expense, all loan exhibits against every risk, whether in transit or during the Exhibition. It may be added that, while detailed arrangements are still in prospect, it is contemplated that music, both choral and orchestral, shall enter largely into the daily life of the Exhibition.

# London Bankruptcy Court.

*Re* Bryce McMurdo Wright.

THIS was a first meeting, held on Friday, 16th ult. The debtor, a mineralogist and jeweller, carrying on business at 204, Regent Street, had a receiving order made against him in August last, and has filed accounts showing gross debts £16,792 9s. 11d., of which £13,418 2s. 7d. is unsecured, and assets £1,713 6s. 2d. A long discussion took place upon the debtor's proposal, which was to vest the estate in trustees to secure the payment of a composition of 5s. in the pound, extending over twelve months, which was accepted.

# Bankruptcy Proceedings.

*Re* Joseph and Frederic Bromage.

A MEETING of the creditors of Joseph Bromage and Frederic Bromage, carrying on business at 113, Vyse Street, Birmingham, manufacturing jewellers—Joseph Bromage residing at Warwick Place, Francis Road, and Frederic Bromage at Carlyle Road, Edgbaston—was held on the 20th ult., at the office of the Official Receiver, Colmore Row. The statement of affairs showed the liabilities to be £4,609 16s. 6d., of which amount all but £175 10s. 6d. was due to unsecured creditors. The net assets amounted to £2,101 17s. 1d., thus leaving a deficiency of £2,507 19s. 5d. The report of the Official Receiver stated that the debtors commenced business in April, 1882, with a capital of £1,000, which they received as part of their interest under the will of their late father. Subsequently they received a further sum of £800. They had not prepared a balance sheet since they commenced business, but in December, 1884, they went through their affairs roughly, and found they were about solvent. In June, 1886, they commenced

pawning goods, and the pawning was continued up to April 29 last. At the date of the petition a pawnbroker held stock estimated at £3,328 19s. 7d., upon which advances amounting to £2,277 had been made. Only two lots of goods had been redeemed. For some time past the debtors experienced difficulty in trading through the want of capital, and for the last six months the profits of the business had been insufficient to pay the expenses. In May last they found they were unable to meet several payments becoming due, and a private meeting of the creditors was held. The statement of affairs showed liabilities £4,229 16s. 6d., and assets £2,351 19s. 5d. An offer of composition of 7s. 6d. in the pound was not accepted, and one of the creditors presented a petition, but the debtors endeavoured to resist the proceedings, and to prevent the receiving order being granted. No purchase ledger had been kept, and the invoices of the goods had been destroyed. In the separate estate of Joseph Bromage the liabilities were £654 12s. 4d., and the assets *nil;* and in that of Frederic Bromage the liabilities were £475 12s. 10d., and the assets *nil.*—In reply to Mr. J. Randall, one of the creditors, the debtors stated that they had given pawntickets as security. Most of them were given to Mr. Dick, but Dick had returned them since his failure. Dick gave them up because he was asked for them.—In answer to the Official Receiver, the debtors stated that they had left the tickets at home.—Mr. Randall asked how many tickets Mr. Smallwood, of Small Heath, had.—One of the debtors replied that he did not think Mr. Smallwood ever had one. The tickets were given to Dick about four months before their failure.—The Official Receiver : Why did you give them to him ? The debtors replied that he had a bill with them, and he pressed them to give him some security or goods, and as they could not pay him they gave him the tickets. Dick returned them about a fortnight ago when asked for them. They owed him about £1,700.—Mr. Harris, who appeared for the debtors, said there was no offer of composition.—Mr. Hill, accountant, was appointed trustee, and Messrs. Randall, Westwood and Evans the committee of inspection.

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In reference to the above case the *Birmingham Daily Post* says : It is hardly to be wondered at that the Birmingham jewellery trade should be in a suffering state when such reckless trading as that revealed in the case of Messrs. Bromage yesterday is resorted to by so many of its members. This is not the first or the second bankruptcy we have reported lately in which the systematic pawning of jewellery has been frankly acknowledged by the debtors ; and though this desperate expedient is doubtless resorted to in the first instance in good faith, as a temporary one, to tide over a particular crisis, it invariably proves to be the first of a series, each representing the link of a steadily lengthening chain, which is destined to drag the debtor into bankruptcy, and seriously aggravate the difficulties of the liquidation. In this case, it appears that the debtors, finding themselves unable to meet their engagements in June, 1886, commenced pawning goods, upon which they obtained advances to the amount of £250. In the following month two fresh transactions with the pawnbroker resulted in an advance of £170, and then the downward impetus being fairly given, the pledging business went on *crescendo* at the rate of five, six, seven and nine transactions a month, until, at the close of April last, the pawnbroker held stock of the estimated value of £3,328 19s. 7d., upon which advances had been made to the amount of £2,277. Out of 50 parcels of jewellery pledged at various times, only two, it seems, had been redeemed, and the marvel is under these circumstances that the debtors, who owe more than £4,200, should be able to offer any composition or show any assets at all. As it is, the creditors find themselves left, as Mr. Fitter yesterday described it, with the wreck of an estate in the shape of an equity of redemption, otherwise the pawntickets of the goods pledged, which the estate would probably never see again. If the mischief were confined to the creditors concerned in the case, other Birmingham jewellers would doubtless be able to bear the misfortune philosophically ; but, as they are well aware, the injury done by the wholesale pawning of goods at one-half or two-thirds of their invoice price, is one that is felt by every member of the trade. For every pawning transaction by a manufacturing jeweller or factor there are probably a dozen cases of underselling, as no loss that can be incurred in this way is likely to equal the loss by pledging. But a still worse service is done to legitimate trade when the pawned goods are thrown upon the market, as they must be sooner or later, and the public are invited to buy jewellery by auction at something like one-half the regular retail price. Scarcely a week passes in this town without one or more auction sales at which jewellery is sold at prices for which it could not be produced; and Birmingham is only one of many distributing centres where similar bargains are constantly offered to the public at the expense of the jewellery trade. Even if the demand for ornaments were much more active than it is, the trade could hardly be in a healthy condition, when it is being systematically sapped in this irregular manner ; and until some effectual method of stopping the leak is devised it seems to be hopeless to pray for improvement. The approbation system doubtless is at the bottom of the evil ; but even if it were abolished it would not wholly prevent the pawning of goods obtained on credit or paid for with long-dated bills. It is the pawning that must be stopped, and if the law as it stands is not adequate to meet the case an amending Act should be obtained to prevent the disposing of manufacturers' stock otherwise than in the legitimate way of trade. It is not always the pawnbroker whose friendly agency is invoked in these irregular and mischievous transactions. Even bankers are not always proof against the temptations to obtain valuable portable cover for their advances. But whatever form the pledging takes, it ought to be equally illegal, seeing that the goods pawned must always represent, to a great extent, the property of the pawner's creditors. We are referring, of course, to wholesale pawning by a trader, which is obviously on a very different footing from retail transactions with private customers, who part with their own personal property to meet a pecuniary exigency. Had such a law as we have suggested been in existence, it is clear that Messrs. Bromage could not have gone on pledging from £200 to £700 worth of their creditors' goods every month, and the trade altogether would be in a healthier position than it is just now.

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## Gazette.

### Partnerships Dissolved.

Truscott & Morgan, Tenby, watchmakers. Phillips & Kahn, Strand, jewellers. Mill & Jones, Swansea, watchmakers. Lezard & Son, Holborn Viaduct, City, watch manufacturers. P. Edge & Co., Tyldesley, pawnbrokers. Hirst Bros., Arlington Street, Clerkenwell, watch case makers. Forbes & Howe, The Broadway, Streatham, jewellers.

### The Bankruptcy Act, 1883.

#### Receiving Orders.

*To surrender in the Country.*—Harry Ambrose, Bath, jeweller. Charles Ionian McKenzie, Dover, watchmaker. James Varley, Bishop Auckland, clockmaker. William Whitehall, Leicester, watchmaker. William Snook, Southsea, watchmaker. Henry Bird, Coventry, watch manufacturer. Benjamin Graham, Wakefield, jeweller. Thomas Coventry Judge, Chard, clockmaker. Charles Fitzgerald and Thomas Young, Bristol, watch manufacturers. George Henry Simmons, Builth, jeweller. Charles Roberts, Abergavenny, watchmaker.

#### Public Examinations.

*In London.*—B. McM. Wright, Regent Street, mineralogist; October 4, at 11.30. A. Furtwangler, Strand, watchmaker; October 18, at 12.

*In the Country.*—H. Ambrose, Bath, jeweller; October 6, at 11.30. Clara Ann Rollason (otherwise Twist), Birmingham, pawnbroker; October 3, at 2. J. Green, Sheffield, pawnbroker; October 6, at 11.30. J. Bromage and F. Bromage, Birmingham, manufacturing jewellers; October 4, at 2. J. Bromage (separate estate), Edgbaston, manufacturing jeweller; October 4, at 2. F. Bromage (separate estate), Edgbaston, manufacturing jeweller; October 4, at 2. W. Whitehall, Leicester, watchmaker; October 5, at 10. W. Snook, Southsea, watchmaker; October 6, at 12. B. Graham, Wakefield, jeweller; October 6, at 11. C. Fitzgerald and T. Young, Bristol, watch manufacturers; October 28, at 12. T. C. Judge, Chard, clockmaker; October 12, at 2.30.

#### Adjudications.

*In London.*—A. Furtwangler, Strand, watchmaker.

*In the Country.*—T. Marson (trading as T. Marson & Co.), Birmingham, jeweller. W. H. Stokes, Birmingham, manufacturing jeweller. J. Green, Sheffield, pawnbroker. Clara Ann Rollason (otherwise Twist), Birmingham, pawnbroker. C. J. McKenzie, Dover, watchmaker. J. Varley, Bishop Auckland, clockmaker. W. Snook, South-

sea, watchmaker. J. Elsner, Birmingham, pawnbroker. H. Bird, Coventry, watch manufacturer. B. Graham, Wakefield, jeweller. W. Whitehall, Leicester, watchmaker. J. Bromage and F. Bromage, Birmingham, manufacturing jewellers. C. Fitzgerald and T. Young, Bristol, watch manufacturers.

### Notices of Dividends.

*In London.*—E. Turnor, The Broadway, Hammersmith, jeweller; 2s. 11½d., first and final: any day except Saturday, Chief Official Receiver, 33, Carey Street.

*In the Country.*—W. Banks, Bolton, optician; 2s., final; September 5, S. Greenhalgh, Bolton. J. Lee, Manchester, jeweller; 1s., first; forthwith, J. Eckersley. J. Bickall, South Molton, silversmith; 4s., first; September 12, Official Receiver, Taunton. Selina Tantam and W. Tantam, Birmingham, pawnbrokers; 1s. 6¾d., first and final; September 19, 25, Colmore Row, Birmingham.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

4,135*a*. H. J. Haight, London, for "Improvements in electro-magnetic clock-time transmitters." (Complete specification.) Dated March 18, 1887.

11,465. H. Conant, London, for "An isochronal clock." (Complete specification.) Dated August 23, 1887.

11,469. J. G. Tongue, a communication from P. Nordmann, United States, for "Improvements in repeating attachments to watches." (Complete specification.) Dated August 23, 1887.

11,522. N. C. Reading, Birmingham, for "Improvements in watch chains." (Complete specification.) Dated August 24, 1887.

11,542. A. J. Boult, a communication from P. Amiel, Spain, for "Improvements in clocks." Dated August 24, 1887.

11,616. A. E. Hotchkiss, London, for "Improvements in the manufacture of lantern pinions for clocks, watches and the like, and in machinery or apparatus for use in such manufacture." (Complete specification.) Dated August 26, 1887.

11,770. J. Juillerat-Berthoud and Alfred Leiser, Consul Suisse à Londres, for "A watch system Callote, bearing but one cover and a dome on the side of the dial." Dated August 30, 1887.

11,938. J. G. Lorrain, London, for "Improvements in or connected with self-winding clocks." Dated September 2, 1887.

11,939. J. G. Lorrain, London, for "Improvements in or connected with self-winding clocks." Dated September 2, 1887.

12,096. W. C. Aldridge, Birmingham, for "Improvements in collar and shirt studs and other like dress fasteners." Dated September 7, 1887.

12,147. N. Hall, a communication from C. C. Hall, Mauritius, for "An improved watch stand and watch regulator combined." Dated September 8, 1887.

12,259. A. F. Small and F. W. Small, London, for "An improved fastening device, applicable for studs, solitaires, waistcoat buttons, brooches, neckties and similar articles." Dated September 9, 1887.

12,306. G. Reimann, London, for "Improvements in automatic calendars for clocks." (Complete specification.) Dated September 10, 1887.

12,332. S. Pearson, A. W. Turner and W. Andrews, Birmingham, for "A new process for extracting aluminum from minerals, and also making aluminum alloys therefrom." (Complete specification.) Dated September 12, 1887.

12,354. E. J. Taylor, London, for "An improved method of fastening or securing collar studs, solitaires, sleeve links and like articles." Dated September 12, 1887.

12,452. F. R. Baker, Birmingham, for "Improvements in solitaire, button or other similar fastenings." Dated September 14, 1887.

12,498. J. Adie and A. Lovekin, Birmingham, for "Improvements in bracelets and bangles." Dated September 15, 1887.

12,607. H. N. G. Cobbe Birmingham, for "Improvements in self-winding clocks." Dated September 17, 1887.

12,649. H. Dalgety, London, for "Improvements in solitaires and the like." Dated September 17, 1887.

12,688. E. G. Staniforth, London, for "An improved clasp stud for shirts." Dated September 19, 1887.

## Recent American Patents.

| | |
|---|---|
| Burglar Alarm. A. E. Hathaway | 368,336 |
| Burglar Alarm. B. F. Hough | 367,523 |
| Chain and Pen and Pencil Holder, Combination Watch. N. Frere | 367,804 |
| Clock Cases, Die for Forming Metallic. M. Fowler | 368,526 |
| Clock, Electric Programme. A. J. Reams | 367,663 |
| Clock, Isochronal. H. Conant | 368,814 |
| Clock, Programme. A. J. Reams | 367,662 |
| Clocks, Controlling Device for. W. S. Scales | 368,689 |
| Cones, Apparatus for Making Sand. J. Foran | 368,915 |
| Cuff Holder, Adjustable. C. H. Murray | 368,350 |
| Cuff Holder. S. B. Ellithorp | 368,081 |
| Cuff Holder. G. H. Phelps | 368,305—368,306 |
| Cuff Retainer. A. Bond | 368,750 |
| Cutlery or similar articles, Manufacture of. H. A. Brognard | 368,061 |
| Cutlery, &c., Manufacture of. H. A. Brognard | 368,060 |
| Emery Wheels, Dresser for. W. W. Brisben | 368,062 |
| Eyeglasses. E. B. Meyrowitz | 368,226 |
| Files, Machine for Cutting. C. M. Fairbanks | 367,382 |
| Finger Ring. J. Scott | 367,449 |
| Finger Ring. R. Weidmann | 368,743 |
| Ingot Manipulator. F. Heron | 368,395 |
| Ingot Mould. H. Wright | 367,571 |
| Ingots, Forming Metal. E. Wheeler | 368,176 |
| Jewellery. C. W. Hartmann | 367,976 |
| Jewellery. J. Lamont | 367,414 |
| Lathe. C. Smith | 368,021 |
| Lathe Tool Holder. J. L. Bogert | 368,749 |
| Micrometer Gauge. F. Spaulding | 368,554 |
| Micrometer Pipe Gauge. D. G. Brown | 368,563 |
| Ore Concentrator. J. H. Pemberton | 368,683 |
| Ore Detector, Electrical. L. Mellett | 367,422 |
| Ore Indicator, Electric. Mellet & Prince | 367,541 |
| Ore Separator. E. A. Wall | 368,033 |
| Platinum, Deposition of by Electricity. W. A. Thoms | 367,731 |
| Rings or Chain Links, Manufacture of. W. A. Peck | 367,923 |
| Rolling Mills, Device for Balancing Rolls of. F. G. Tallman | 367,464 |
| Sand, Machine for Screening and Moistening Moulding. G. Guntz | 368,333 |
| Scarf Holder. W. P. Clarke | 368,380 |
| Screw Cutting Die. G. Emig | 368,462 |
| Spectacle Frame. W. Ramsay | 368,852 |
| Spectacle Joint. F. Scheidig | 367,552 |
| Thermometer, Recording. W. H. A. Bogardus | 368,319 |
| Wire Drawing Machine. W. H. Sawyer | 367,667 |
| Wire Drawing Machine. W. Wallace | 367,733 |
| Watch Case Spring. G. A. McCay | 368,100 |
| Watch, Repeating. A. P. Pfister | 368,002 |
| Watch, Repeating. G. Aubert | 368,904 |
| Watches, Push Button for Repeating. C. Morlet | 367,995 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. Truslove, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Correspondence.

*All Letters for Publication to be addressed to the* Editor *of* The Watchmaker, Jeweller and Silversmith, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

### To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—The Prime Meridian Conference, held at Washington in 1884, recommended for universal adoption :—

1. Greenwich as the initial meridian.
2. Longitudes to be reckoned east and west to 180° from Greenwich.
3. A universal day for all purposes for which it may be found convenient, and which shall not interfere with the use of local or other standard time where desirable.
4. The universal day to begin for all the world at midnight at Greenwich, and to be counted as 24 hours.
5. The civil day to be used for all purposes, abolishing the astronomical day and the nautical day so called.

Are these recommendations ever likely to be acted upon, and if so, when and to what extent; or are they merely the ghostly reminiscence of a pleasant holiday trip experienced by the Conferees at the public expense, according to the usual outcome of such conferences?

Yours faithfully,

R. Strachan.

11, Offord Road, N., *September* 3.

### [MELBOURNE CENTENNIAL EXHIBITION.]

Sir,—I have the honour to inform you that it has been decided by the Government of the Colony of Victoria to hold an International Exhibition of Arts, Manufactures, Agricultural and Industrial Processes and Products in the City of Melbourne, in celebration of the Centenary of the Settlement of Australia; and that the Exhibition will be opened on August 1, 1888, and will close on January 31, 1889.

An Executive Commission has been appointed by the Governor, under the Seal of the Colony, to conduct the Exhibition; and its London Committee, who have control of all questions concerning the exhibitors of the United Kingdom, consists of the following gentlemen:—The Hon. Sir Graham Berry, K.C.M.G., Agent-General for Victoria, Chairman; The Right Hon. Hugh C. E. Childers, M.P., Sir Henry Barkly, G.C.M.G., Lieut.-General Sir Andrew Clarke, R.E., G.C.M.G., Sir James McCulloch, K.C.M.G., Sir Samuel Wilson, M.P., The Hon. James Service, The Hon. J. Dennistoun Wood, Charles E. Bright, Esq., C.M.G., John Badcock, Esq., John H. Blackwood, Esq., John MacIntyre, Esq., John M. Paterson, Esq., William Peterson, Esq., Robert Rome, Esq.

The offices of the Commission in England will be at 8, Victoria Chambers, Westminster, adjoining the offices of the Agent-General for the Colony, and all communications should be addressed to the Secretary at that address.

Her Majesty's Government propose to issue a Royal Commission, of which His Royal Highness the Prince of Wales has graciously consented to be President, to co-operate with the Government of the Colony in ensuring a due representation of the Arts and Manufactures of the Queen's dominions, and have promised to use their good offices with the Governments of Foreign States, of the Indian Empire, and of the Colonies other than those of Australasia, to make the Exhibition truly representative of the works of all nations.

I am instructed to request your particular attention to the following figures, which give a general view of the trade of the United Kingdom with Australasia, and which are published on the authority of Government returns supplied to the Commission:—

> "During the year 1885 Australasia, with a population of 3,500,000, imported from Great Britain goods to the amount of £32,000,000. The United States, France and Germany, whose combined populations number 133,000,000, imported during the same period from Great Britain, to the amount of £53,000,000. Calculated at per head of the population, Australasia therefore imported nearly 23 times as much as the above-named countries combined; and this in addition to a large and increasing trade with other countries."

The last International Exhibition held at Melbourne, in the year 1880, was followed by a most remarkable increase in the imports of the Colony, due no doubt in great part to the stimulus thereby given to trade. The imports of Victoria, which in 1880, the year in which the Exhibition was held, were £14,556,894, rose in 1881 to £16,718,521, and in 1882 to £18,748,081. The capitals of the adjoining Colonies, Adelaide and Sydney, are now connected with Melbourne by railway, and before next year the line to Brisbane will be open, so that the population of the greater Colonies will be placed within easy access of the Exhibition. It may thus be fairly hoped that the stimulus given to British trade, not merely with Victoria, but with all the Australasian Colonies, will even exceed the remarkable results which followed the Exhibition of 1880.

The main buildings erected for that Exhibition are of a permanent character and fine design. To these will be added annexes of iron, covering, according to a telegraphic despatch just received from the Colony, a total area of 24 acres. No charge will be made for space. The detailed prospectus and forms of application can be obtained on personal or written inquiry at the above address. Applications for space should be returned to the London offices on or before August 31; but it is requested that, in view of the distance at which the Exhibition is held, and the time necessarily involved in correspondence respecting the arrangements for the perfect accommodation of all exhibitors, the applications may be sent in at as early a date as possible. I am to add that every facility will be afforded to exhibitors respecting customs, transit from wharves to Exhibition, and supply of motive-power.

In conclusion, it may be stated that the Government of Victoria are determined to use all their influence to make the Exhibition in every way worthy of the great historical event which it commemorates, hoping besides that it may, like its predecessor of 1880, be the direct means of promoting a largely-increased personal and commercial intercourse between the Colonies and the United Kingdom. And it is in this spirit that the Executive Commission at Melbourne invites exhibitors from all nations in the following words:—

> "In view of the remarkable growth of Australasia in all things relating to population, production, and general distribution of wealth among all classes, the facilities for rapid, economical and easy transit, and its many other advantages, the Commissioners confidently invite all desirous of extending commercial relations with these rapidly-extending communities to exhibit the fullest and most complete representations of their Raw Products, Skilled Industries and Arts at the Centennial International Exhibition, Melbourne, 1888."

I have the honour to be, your obedient servant,

J. Cashel Hoey.

## Buyers' Guide.

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

VOL. XIII.—No. 5.] NOVEMBER 1, 1887. [Subscription, 5s. per Annum. { Post Free.

## SPECIAL NOTICE.

**Our correspondents are kindly requested to note that the Office of this Journal has been removed to more commodious premises at No. 7, St. Paul's Churchyard.**

## CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to

THE WATCHMAKER, JEWELLER & SILVERSMITH,
7, ST. PAUL'S CHURCHYARD, LONDON, E.C.

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

THE constantly growing foreign competition in all kinds of cheap watches, and the success attending the general systematisation and the factory system abroad, have lead to many suggestions being made from time to time for the establishment of watch factories on a large scale in this country.

But most of the suggestions thrown out have been of the most vague and shadowy description, and have been more of the nature of colloquial "we ought to's" than of that of practical proposals. At any rate the plan of Mr. T. P. Hewitt, for the establishment of a watch factory at Prescot (which we publish on page 70), is the first that has been publicly formulated since the time of Ingold. Mr. Hewitt says "that the cheap class of work is fast leaving the town must be known to anyone acquainted with the trade ten or fifteen years ago," and that it is no use hiding the fact that our watches are too dear for the present demand; we are making watches that the public either will not or cannot afford to buy, and they are supplying themselves with cheaper watches of foreign make. It will avail us nothing to say or think these watches are not as good as ours; it is better we should see that while we are idle these watches are being made and sold. And again, he says that our present system of manufacture is far behind that of other countries, so far as applies to the production of cheap watches. Further, he states that movement makers have long seen this and have modified their system of manufacture accordingly; but that all has been of no avail on account of the finishing processes in the manufacturers' hands being too slow and expensive. Having carefully gone into the question of cost with makers of machine-made watches and persons engaged in the manufacture of machine tools, Mr. Hewitt comes to the conclusion that £100,000 in round numbers would be a sufficient sum with which to start a factory in full working order, leaving an ample margin for contingencies and working capital. This sum would, he estimates, start a factory capable of turning

out 1,250 watches a week, which at a very small profit would yield a return of over 10 per cent. on the capital employed.

Now this is something like a proposition and a way of meeting foreign competition. As to its feasibility—only show the public something like a possibility of getting 10 per cent. for their money, and you could soon raise a million. From an outsider's point of view, it is simply incomprehensible why a country, commanding unlimited capital (which is forthcoming at any and every demand), where any amount of labour (skilled and unskilled) is obtainable at the lowest rates, and which is the matrix of every kind of machinery, cannot hold its own in the manufacture of a class of goods in which it has long been pre-eminent. It may be that very pre-eminence in the past has a good deal to do with the question. It is, however, necessary in dealing with this subject to give a more particular regard to details. Looking at such a question commercially, one would naturally weigh, one with the other, all the circumstances for and against any particular project; and before being able to do so with a satisfactory result it would be necessary to consult representative men of the trade in which the proposed change is to be effected. But although there is not a more intelligent body of men in the world, as a class, than those engaged in the English watch trade, nor one better able to give an opinion upon their trade under existing conditions, it should be considered in consulting them that they have been working in one particular groove for so long that it is not without an effort they will be brought to consider the subject from more than one standpoint, any radical departure from which they will as likely as not strenuously oppose. All possible details should therefore be collected without loss of time and circulated throughout the trade, so as to secure their concurrence to the scheme, as well as with a view to educating them up to the point of departure.

## General Notes.

ACCORDING to a telegram in the Melbourne *Argus*, dated "Perth, September 5," a pearl, weighing 62 grains, and valued at £800, was found on the Ninety-mile Beach by Mr. George Roe.

IT is officially announced that the Exhibition of the Queen's Jubilee Presents at St. James' Palace will close after Wednesday, the 23rd inst.

ANTWERP EXHIBITION.—Out of 39 British exhibitors, nineteen have gained the highest awards in their respective classes. Messrs. Haywood & Co., cutlers, Sheffield, have been awarded the *Diplome d'Honneur;* while Messrs. Wellmann & Co., London, and John Round & Son, Sheffield, have gained the gold medal for cutlery and electro-plate respectively.

THE BRUSSELS EXHIBITION OF 1888.—The Executive Committee of the International Competition and Exhibition which is to be held at Brussels next year has, we hear, with the consent of the Belgian Government, nominated Mr. Lee-Bapty, the General Manager of the Royal Jubilee Exhibition at Manchester, Commissioner-General for the British Empire. A space of 20,000 square metres has already been retained for the British section of the Exhibition.

THE GLASGOW EXHIBITION.—The buildings for the Exhibition to be held in Glasgow next year are rising rapidly on the borders of Kelvingrove Park. Everything seems in an unusually forward condition, and the opening is definitely fixed for the first week in May. The Queen will be asked to officiate on the occasion, but in all probability the Prince of Wales will be deputed to perform the ceremony.

A COLLECTION of jewels, including some unusually fine opals, pearls and rubies, was offered for sale by Messrs. Debenham, Storr & Sons on the 25th ult. The following are among the prices realised: A brilliant pendant, 222 gs.; a brilliant head ornament, 210 gs.; a brilliant head ornament, 126 gs.; a sapphire and brilliant bracelet and earrings, 315 gs.; a set of rings, comprising a brilliant ring, a ruby ditto, a sapphire ditto, and coral ditto, 538 gs.; and a brilliant and ruby ring, 115 gs.

THE London Chamber of Commerce has proposed to form a Watch Trade Section, for dealing with purely commercial matters in connection with the trade. In the circular convening the preliminary meeting for October 27, it is stated that on all the subjects which might be considered, the recommendations which the Section could make to the Council would be of special value, and the influence of the Chamber with the Government Departments, with Parliament, with Provincial and Colonial Chambers of Commerce, and public bodies generally, would greatly assist in carrying them out.

ON Tuesday, the 11th ult., a meeting was held in Prescot Town Hall, Lancashire, for the purpose of considering a proposal to establish a factory in Prescot for the complete manufacture of watches. The chair was occupied by the Rev. Harry Mitchell, vicar, and there was a large attendance of watch manufacturers and others. During the discussion references were made to the American competition, and the opinion was expressed that the drifting trade of the town could be again made prosperous if a company were formed to complete the watchmaking in all its branches, a resolution to this effect being carried.

ONE of our Birmingham friends sends the following cutting from a local newspaper:—Councillor Lawley Parker the other day, referring to the delay in the laying down of the cable trams, said it was partly caused by the extreme care which had to be exercised in fixing the works. He said the parts had to be fitted together with as much mathematical accuracy as the works of a watch. Judging by the appearance of the appliances, the worthy Councillor must wear a Waterbury, and at some time or other been curious enough to raise the cap. The comparison is by no means a bad one. A Waterbury has many things in common with a cable tram, and I should think they were both invented by the same man.

THE shareholders of the Opal Mines of Queensland, at the statutory meeting held on October 20, inspected the several gems sent over from the Colony. Some of them are really very fine and large. The shares, it appears, have been well distributed amongst a large body of investors, and the Company has already commenced operations. The Chairman (Mr. George Hopkins), in the course of his speech, said they had a sufficient quantity of opal in stock to commence sales; but it would be evident to every shareholder present that in dealing with an article like precious stones, it was very desirable not to make sales in such quantities as would have the effect of flooding the market. They had already effected some sales, and had numerous inquiries from various quarters which would, he felt, satisfactorily enable them shortly to effect considerably larger sales. He believed that in this country there had been, in times past, some prejudice against the opal stone, but he thought that this was gradually dying out as a superstition; and certainly in Russia, and on the Continent generally, no such prejudice existed. The directors hoped to pay a dividend at no very distant period.

The death is announced of Mr. George Sim, F.S.A. Scot., a well-known Scotch antiquary, in his 73rd year. Devoted to the science of numismatics from an early age, he amassed during his life a collection of Greek and Roman coins which for extent and variety is said to be unequalled by any other in the country. It comprises upwards of 13,000 specimens, many of them very fine and rare, and the collection is especially rich in Consular and Imperial coins, as well as in the Greek, Bactrian and Parthian silver series. Mr. Sim catalogued the coins, so that they might be made useful alike to students of geography, mythology, history and art. As Curator of Coins at Edinburgh he contributed to the transactions of the Society of Antiquaries numerous papers on the discovery of coins in Scotland. He was also a contributor to the *Numismatic Chronicle*, and at the time of his death was engaged in an important work on the coinage of Scotland, which he took up on the death of the late Mr. Burns, F.S.A. This work will shortly be published.

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Mr. B. H. Thwaite, of Liverpool, and Mr. A. Stewart, of Bradford, have discovered a new process of steelmaking which is particularly applicable to small foundries. It is carried out by melting the pig metal in what is known as a "rapid" cupola, and collecting it in a receiver, from which it is run into a vertical converter, and from thence drawn off in the ladle. In its passage through the converter the metal is subjected to the blast from the cupola blower. As soon as the metal is collected in the ladle, the latter is raised from its trunnions and rapidly revolved. Stirrers effectually mix the metal, and the steel is then ready for the moulds. It will thus be seen that the process is rapid and the plant simple. The system can be applied to existing open-hearth furnaces, in which case the special converter is placed in the centre over the furnace roof. The metal is run from the cupola either by means of a runner or ladle, and in its descent into the open-hearth furnace it is subjected to annular jets of air from the cupola blower. The conversion of the metal is completed in the open-hearth furnace in the ordinary way. The "rapid" open-hearth steel plant has a decarburising cylinder placed at a slight angle with the horizon and through which the metal flows into the open-hearth furnace and is partially converted therein. The completion of the process is effected by a highly oxidising and plenum character of combustion. The gaseous fuel is supplied from a Thwaite gas-producing plant. The time of conversion is stated to be about one-third that of the ordinary open-hearth process. The "rapid" process is in course of adoption at various works, the plant being manufactured at the works of Messrs. Thwaite Brothers, of Bradford.

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The Diamond Market.—*Amsterdam.*—The demand for finished goods has been steadily increasing throughout the month. *Roses* have been in strong request, and from 4 to 6 grain stones. As stocks diminish a visible improvement for sellers is to be observed, although, owing to their not regulating the prices among themselves and sticking to fixed terms, buyers have the best of it, and no very good prices are obtainable. *Rough* remains dear, but factories are fully occupied.

The *Paris* trade towards the end of the month greatly improved. Important parcels have changed hands, and the trade in mounted goods, both for the home and English markets, has been very lively.

The steamers "Pretoria," "Norham Castle," "Trojan," "Grantully Castle," and "Mexican" arrived at Plymouth during the month, bringing large consignments; and as prices were quoted somewhat lower, some large parcels changed hands.

Latest from *Kimberley* state that while prices continue firm, less buoyancy has latterly distinguished the market, in consequence of which, while fresh goods are in fair demand, dealers' parcels are neglected.

Silver.—The market has remained weak throughout the month, but notwithstanding some fluctuations in the Indian exchanges, it has continued steady, 44½d. per oz. being about the average nominal price for bars.

## Trade Notes.

The London Watch Trade Association.—The first annual meeting of the above Association was held on Wednesday, 5th ult., in the Schools of the Martyrs' Memorial Church, Clerkenwell, Mr. S. A. Brooks (president) in the chair. There was a large attendance.—The Secretary (Mr. Newman) first read a letter from Captain Penton, M.P., in which he wished every success to the Association, and enclosed a cheque for £50. Messrs. J.W. Benson also wrote enclosing a cheque for £10 10s., and stating they were in perfect accord with the objects of the Association, had supported and would continue to support the English trade.—Mr. Brooks, in a short *resumé* of the year's work, spoke of the readiness with which members of the trade came forward to protect their own interests, the result of which was that at their first meeting, just twelve months since, 150 members joined. This number had been increased at each succeeding meeting; and they had a committee who went about their work so thoroughly and educated Members of Parliament so well up to what was required to protect the English watch trade, that now, at their first annual meeting, they had to report the passage of a Bill through Parliament which well protected them. The London makers had got the sympathy and co-operation of fellow watchmakers in Prescot, Coventry, Liverpool, and a few from Birmingham, and when they had to go before the Committee of the House of Commons they had nine Members of Parliament with them; and when the Government saw the earnestness of the men they promptly dealt with the question. The result was that they had a measure which enacted that no one could sell a watch with the English Hall-mark if any portion was of foreign make. It was no exaggeration to state that the shopkeepers were fairly "struck" by the Act; they did not believe the Government would pass a measure which would place them in the difficulty in which they now were, viz., that they had to give to the customer a descriptive account of the contents of the case unless of entirely English make. But from information received from all parts, he believed there would be an honest endeavour all round to comply with the Act of Parliament. The foreigners, however, were still Hall-marking their cases, and it was said that one Swiss firm was going to bring over its workmen to England in order to produce its watches.—Several votes of thanks were passed, and the proceedings closed.

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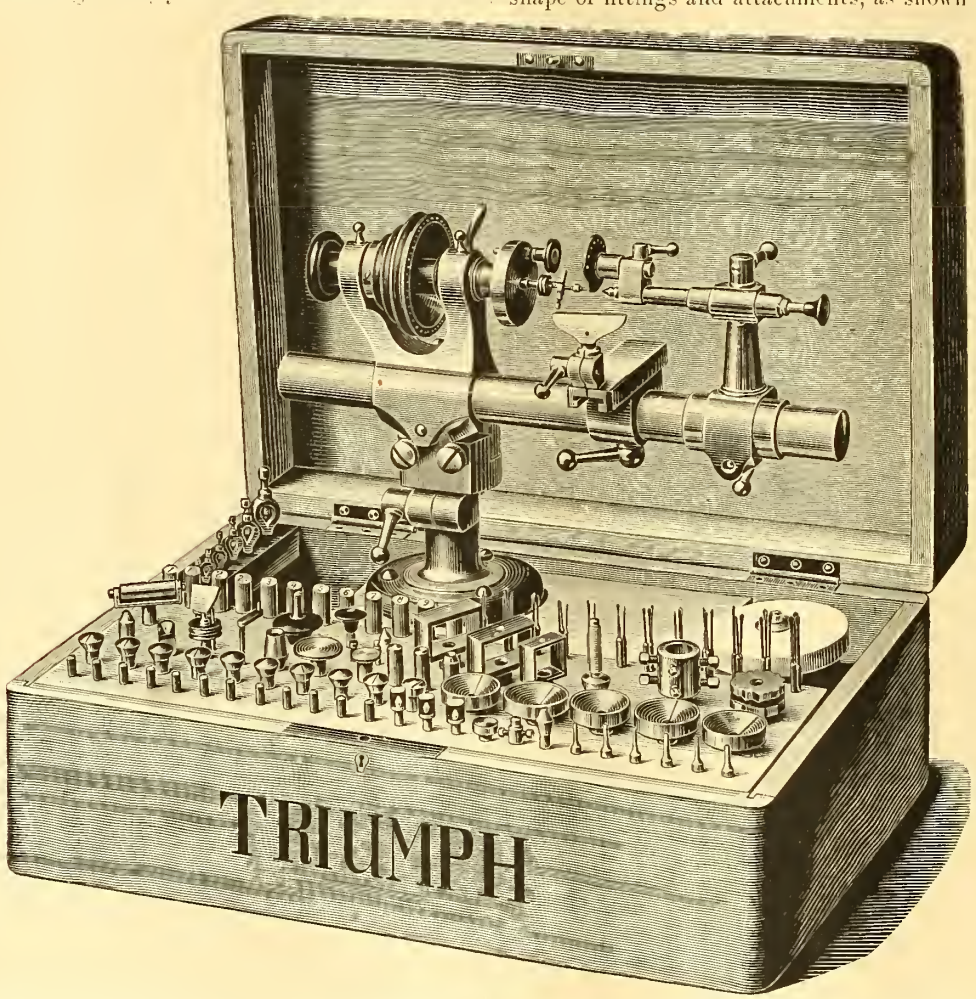
The *Opsiometer* is the name of a new instrument for measuring the sight which has just been brought out by Messrs. J. Raphael & Co., wholesale opticians, of 13, Oxford Street, W. It consists of a handsome mahogany cabinet of about a foot square by 15 inches high, the back part of which lets down on to the counter with two eye-holes in front. At right angles to the back is fixed a piece of board which, when the former is let down, stands up at exactly 14 inches (the prescribed optical focus) from the eye-holes. The interior of the box contains two slips of velvet worked on rollers, each carrying a complete set of test glasses in all sights—from strongest to weakest, in convex and concave. Upon looking through the eye-holes two knobs at the sides of the box are turned until glasses of suitable sight are in position, when it can at once be seen what strength glasses are required, by means of numbers stamped on the velvet which appear through two smaller holes at the side of the eye-holes. As each set of glasses is shifted independently of the other, persons with odd sight can be accommodated without trouble. The *Opsiometer* is a great advance on any of the primitive and troublesome arrangements for suiting customers heretofore employed by retail opticians and others; while affording a speedy and certain method of ascertaining all possible focal requirements, its use obviates the necessity for overhauling and soiling stocks, which is one of the chief worries of the retail optician's business. Its advantages are manifold and obvious: being at once portable and compact, it forms an attractive addition to the counter; and as its price brings it within the reach of all, it is sure to be in strong demand by all who deal in optical goods.

NEW MAYORAL CHAIN FOR HANLEY.—At a special meeting of the Hanley Town Council, held on the 11th ult., the presentation of a new mayoral chain to the borough, the gift of Herbert Keeling, Esq., Shelton Hall, in commemoration of Her Majesty's Jubilee, was made. The chain is a magnificent work of art, and for beauty of design and chasteness of pattern is probably unrivalled throughout the boroughs of the United Kingdom. It is 60 inches in length, and weighs nearly 40 ounces of solid 18-carat gold, Hall-marked throughout. The chain is composed of the letter H (the initial letter of the borough name) with Staffordshire knots at intervals and a series of 26 escutcheons, each bearing a shield. On the front of the shields are the monograms in enamel of the 26 mayors who have held office since the incorporation of the borough, and at the back of the escutcheon is inscribed each of these mayors' names and the date he held office. Over each escutcheon is a handsomely wrought mural crown—*corona muralis*. Dependent from the chain is a massive and gorgeous badge, bearing the arms, crest and motto of the borough in enamel and gold, fully emblazoned in colours. On one side of the badge and forming part of the general design are the Royal arms and crest of England, and on the other side the Jubilee memorial, consisting of the Royal Crown of Victoria with the initials V.R. in monogram, skilfully wrought in upon an artistic representation of the Tudor rose. The style is Renaissance, imparting a harmonious effect throughout. Above the pendant badge is an elegant centre link, in the form of a shield, with oak and laurel wreath, and the initials of the donor surmounted by his crest and surrounded with a motto, "*Perseverentia Vincit.*" On the back of the badge is the following inscription:—"Presented to the Corporation of Hanley by Herbert Keeling, Esq., Shelton Hall, Hanley, in commemoration of the Jubilee Year of Her Majesty Queen Victoria, October, 1887." The badge is constructed so that it can be detached from the general chain and worn as a special and separate decoration when required. The cost of the chain is about £300; its manufacturers are Messrs. T. & J. Bragg, Birmingham, whose high repute is fully maintained by their latest *chef-d'œuvre*. The commission was given to Messrs. Henry Pidduck & Sons, Hanley.

THE "Dorcas" thimble, is, we think (although apparently a very small matter), destined to play an important part in the household economy of the future. Most people are aware of the want of durability of the ordinary silver thimble, and many have experienced the pains of pricks received from needleheads going through holes in partially worn out thimbles. The invention under notice, which is the patent of Mr. Horner, of 23, Northgate, Halifax, is practically everlasting in this respect, as it consists of two parts of silver and an intermediate one of steel, which are all struck up together and form a light and durable thimble that is sure to be in strong demand as soon as its properties become generally known to the sewing community.

THE "TRIUMPH" LATHE.—Since our last notice of this useful tool, it has had added to it several valuable improvements in the shape of fittings and attachments, as shown in the annexed cut.




COUNTRY dealers, watchmakers and jewellers should write to Messrs. H. J. Cooper & Co., 150, Oxford Street, W., for their new illustrated catalogue and price list just published. It is very clearly descriptive, and the illustrations of patterns, especially of chains and rings, are unmistakable.

WHEN Swift made Mr. Lemuel Gulliver put on his glasses to protect his eyes from the darts and arrows of the Lilliputians, it is doubtful if it ever occurred to him that his idea would one day be put into actual practice. Such, however, has been the case in the origination of shot-proof spectacles for sportsmen, just introduced by Mr. A. W. Newbold, of 37, Spencer Street, Clerkenwell. These are made in all sights in crystal pebbles, and in every description of mounting; and in view of the accidents that are constantly occurring among the stubble, will doubtless by their ready sale soon repay the enterprise of their inventor.

# Birmingham News.

From Our Correspondent.

A MUCH brighter and more hopeful tone prevails here than has done all the year. Some of the makers of silver jewellery have orders which have made it necessary to increase their number of hands, and the general report is that trade is stirring. A walk round the "jewellers' quarter" after 7 p.m. reveals a number of workshops with their lights still going, a clear proof that they are anxious to make up for the time lost during the awful summer stagnation, and also that they have the orders to enable them to do so.

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Unemployed workmen have mostly all obtained situations during the last fortnight, and one of the manufacturers was complaining to me that he wanted a good man and could not get one: this is one of the strongest proofs of an improvement in trade that I could give.

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There is always a certain amount of gossip going about the trade with more or less truth attached to it; the latest is, that the wife of a recent bankrupt is boasting to her lady friends that her husband is £3,000 better off than he was before the bankruptcy. What do the creditors think about this little matter? Those lady friends were no doubt instructed "not to mention this for the world," but there was evidently a "traitor in the camp."

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A practical man once described a jeweller as "a person with the patience of Job and the ingenuity of the devil;" but judging by prices paid to workmen lately, patience and ingenuity must have become very prolific, or, on the other hand, they manage to get along without them. There certainly cannot be much of either brought to bear when one gross of studs and solitaires is required to be made for 6s., all soldered together and no press-work; or, as in another case, to turn out one gross of silver brooches per day: no wonder at the market getting overstocked.

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Bank failures always affect to a large extent the purchasing capabilities of one or more sections of society. Some of the ever-complaining souls in the Birmingham trade are promising the spoliation of the shopkeepers' trade for the winter in Warwick, Leamington and adjoining districts, by the collapse of Greenway's Bank; and as the source they obtain their jewellery from is Birmingham, the aforesaid complaining ones are meeting sorrow half-way by making out, no doubt, that they will thus be deprived of a certain part of their winter trade. Well, it may affect a few who depend solely upon the home trade, but I think they are very few and far between.

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The watchmakers in the district appear to be anxious to supply the public with the "time of day" in a gratuitous manner that is quite refreshing. Mr. Riley, Vyse Street, had a clock placed by the side of his window some few years ago; since then, Mr. Krauth, Great Hampton Street, has erected an imposing pedestal in his front garden, supporting a clock; and, lately, Mr. W. H. Brown, Great Hampton Street, has eclipsed them all by erecting over his shop a large illuminated clock with three dials, which is certainly an addition to the neighbourhood, and is particularly convenient at night. Evidently Mr. Brown does not intend to be outdone in generosity, and this will no doubt be appreciated by his numerous customers and the public generally.

* * *

I am always pleased to find practical men putting aside old prejudices and adopting new ways of working which are more economical, speedy and scientific; and, in the course of conversation with a number of them, I am convinced that technical education is making itself felt. For instance, quite a number of them have adopted the use of T. Fletcher & Co.'s new melting arrangement—the one with the crucible and ingot combined. They report it as being eminently successful, and, for small quantities of gold or silver up to about 5 ozs., as being the most speedy and accurate in its results: a few of them have used this from the time of its invention, but it is only lately that any number of them have been in use. The arrangement is particularly adapted to working jewellers in small towns who want to melt a clean little ingot of from 5 ozs. to 10 ozs. or less, without the trouble of a coke furnace. The whole apparatus with blower takes up very little room, and the cost is trifling: from 30s. upwards complete. If any of our country readers wish to adopt this method, they can obtain the apparatus with instructions from Mr. A. Osborne, 89*a*, Spencer Street, Birmingham.

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Numerous are the devices that have been brought to bear in order to prevent the pilfering of gold and silver by workmen and boys in the manufactories; but the failures attending each have been as numerous and frequent. That there is an enormous amount of it takes place every year is a well-known fact, the difficulty being to fix upon the thief. The usual methods for checking workmen is to weigh out to them all the gold, silver solder, &c., and weigh back again the work produced, and any scrap, lemel, &c., that may accrue in the working, allowing a small margin for the unavoidable loss which occurs. If the man "weighs up" short of the proper amount, it is clear something is wrong; but then comes the difficulty. The man in question is perhaps one of your oldest and most trustworthy hands; you feel sure that he is not the culprit—the thief would most probably prefer to rob another man's box than to weigh back short himself—you are more inclined to let the thief go than to accuse an honest man whom you have respected for years; but some steps must be taken in the matter. Perhaps the best plan is to watch very carefully for the next few weeks; the thief will gain confidence by being able to repeat the offence, and you will be much more certain of your man in this way than by trusting entirely to the weighing up plan; then, having seen enough to decide upon the culprit, communicate with the detective department, and insist upon having the man watched as he leaves work in order to find the receiver. This is an important point, as the receiver is the greater rogue of the two, and he is the man who generally gets off (and the detectives know why): so I say, insist upon him being tracked, as "no receivers, no thieves" is an old adage and true. This is the *modus operandi* just pursued by Messrs. G. E. Walton & Co., Hylton Street, Birmingham (an account of which will be found in another page), and with immense success; the receiver being convicted and awarded five years' penal servitude. If this plan was adopted and pursued more rigorously, there would be much less pilfering, as in all cases the receiver suggests the theft to his dupe, and he nearly always selects a boy or very young man: in the case referred to, the culprit is 22 years of age and the receiver 50 years. The verdict and sentence are most just and very satisfactory.

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In South African diamond mining, according to Mr. G. F. Kunz, the well-known American expert, the enormous sum of over £1,000,000 is annually expended for labour. This mammoth investment of European capital has been profitable to the shareholder, and it would have been still more so were it not for the thievishness of the native diggers, who, instigated by the vicious whites that congregate at the fields, steal and dispose of from one-fifth to one-quarter of the entire yield. More improved methods of surveillance, recently introduced, have diminished this loss. None but authorised agents are permitted to purchase or possess rough diamonds, and a large detective force is on the alert to prevent any infringement of the rules. The lengths to which the natives and their white accomplices go in their fraudulent traffic may be judged from the fact that chickens have been decoyed to the mines by them and made to swallow diamonds. A *post-mortem* recently held on the body of a Kaffir, who had died suddenly, revealed the fact that death was caused by a 60-carat diamond which the native had swallowed.

## A Watch Factory for Prescot.

THE following circular has been sent to prominent members of the trade by Mr. Hewitt :—

You are doubtless aware that an Act has been passed during this Session of Parliament which, it is expected, will beneficially affect the watchmaking industry of this country. For some months it has been contemplated to form a company in Prescot for the purpose of manufacturing good, sound, English watches, of special designs, and at prices that would command ready sales, and compete successfully against all other watches offered to the public ; and the present time is considered opportune for commencing operations. In order to effectively carry out this enterprise it would be necessary to erect large and suitable premises, with a full complement of automatic and other machine tools of the most advanced type, and it is estimated that a capital of £100,000 (made up as follows) would be needed for the purpose :—

| | |
|---|---|
| Buildings, fixed machinery, shafting and other plant, say ... ... ... ... | £10,000 |
| Automatic machine tools, say ... ... | 30,000 |
| Materials, stock-in-trade, say ... ... | 15,000 |
| Working capital, wages, &c., say ... ... | 20,000 |
| Contingencies—Capital probably not required to be called up until works further developed ... ... ... | 25,000 |
| | £100,000 |

That there is a large and increasing demand for watches and other timekeepers is evidenced by the vast number imported from Switzerland, Germany, America and France, together with the quantity manufactured in this country, which annually amounts to upwards of 675,000.

The manufacture of watch movements in Prescot has hitherto been upwards of 2,500 weekly (one firm alone having made about 1,200 of that number) : and it is fully believed that this quantity could be largely increased by the further development of the factory system, and the *economical completion of every part of the watch*. A well-equipped factory, such as is contemplated, would be capable of turning out at least 1,250 watches a week ; and at the very small profit of 2s. 6d. on each watch, would produce a return of over 10 per cent. on the capital employed. It is reasonable to assume that this output would be increased on the qualities of the watches becoming known, and such increase would necessarily lessen the cost of production on the whole, and ensure 12½ per cent. profit all round. In addition to the manufacture of the special designs in complete watches, the Company would, with their machinery and ample appliances, be able to supply against very little, if any, competition, the demand for movements by makers of hand-finished watches. The advantages of immediately forming a watch company in Prescot are many, and amongst others may be mentioned the abundance of skilled male and female labour, and the employment of automatic tools and machinery which have been gradually developed during the last twenty years, and have now passed their experimental stages. I shall be glad to have your endorsement of this scheme, and to learn that it will have your co-operation and support.

Yours faithfully,

Prescot, Lancashire, *September*, 1887. THOMAS P. HEWITT.

And the following letter appeared in the *Prescot Reporter* :—

SIR,—In response to your further invitation, I now forward to you my views on the management for the projected watch company. It suggests itself to me that the stockholders would appoint on the directorate gentlemen who would be sufficient guarantee that the funds would be properly handled, and who would also command respect as being men of good business capacity. The board of directors would at once appoint a general manager of the whole undertaking. I need scarcely say that this person would require to have a good knowledge of watchmaking generally, as well as some experience of machinery as used in the manufacture of watches, and ought also to have large commercial experience. It would then be necessary to engage a specialist in the engineering department. This person would undertake the superintendence of the whole of the machinery to be constructed and purchased, as well as see that it was kept in the most effective repair and the highest state of efficiency. The manufacture of the watches would be entrusted to the master watchmaker, who would devote the whole of his attention to the designing of the watches to be put on the machinery, and would also have the reponsibility of seeing that the production was kept up to its fullest capacity. I need hardly say that on the selection of these three persons would depend in a large measure the success of the undertaking, and I would most respectfully suggest that it would be a matter of prudence and economy to get the very best men possible. If the opportunity presented itself, applications would be sure to be sent in, out of which careful and judicious selection could be made. Minor appointments would then follow in each of the departments—the commercial, the engineering and the watchmaking. With regard to the appointments in the commercial department, I think it will be generally admitted that little or no difficulty would be experienced there. As we are in close proximity to Manchester and district, where the construction of machinery (both large and small) for all purposes has long been established, I am satisfied that this department would be as well supplied as it is possible to have it. In the watchmaking department would be required foremen of the several branches, such as case making, frame making, pinion making, escapement making, balance making, dial making, jewelling, springing, timeing, &c. The most intelligent watchmakers have for some years past seen that watchmaking in future would have to be conducted on the machine system, and have been devoting their energies and attention to devising plans for producing several parts on the interchangeable method. From these you would be sure to draw men thoroughly capable of carrying out all details required, as I am sorry to have to admit, as present conducted, the watch trade offers no such advantageous occupations as these suggested. I do not know that it is necessary to give any further information on this subject ; but would most earnestly recommend that this enterprise be carried out without further delay, being persuaded that if not done in Prescot it will be done in some other part of the country, as there is a general consensus of opinion existing among all classes of watchmakers, that the manufacture of watches in future can only succeed on such lines as I have ventured to lay down. As a Prescot man, it would give me the greatest delight to see Prescot (having devoted itself to the watchmaking industry for centuries past) again to the fore, prosperous and happy, not only supplying her own country, but sending her watches into all parts of the world, stamped and branded with the honest guarantee of the Prescot Watch Co.

Yours faithfully,
T. P. HEWITT.

In commenting on the above scheme, *The Reporter* says : As was not unlikely, he (Mr. Hewitt) travels over some ground which has already been trodden by former correspondents. But in doing so he gives emphasis to facts which cannot be too strongly impressed upon the minds of local watchmakers. His argument is, that however low the cost of an English-made watch is brought, when it reaches the market its price is too high for competition with the foreign watches. The skeleton of the watch, the movement, is made at Prescot at an exceedingly low price, but the movement is not a watch. It has to go elsewhere for its completion—finishing, dialing, casing, and what not. Finished machinery, accurate and rapid in its production, produces the movement, which then leaves Prescot to go through a considerable number of old-fashioned slow processes before it can be made into a timekeeper. Slow labour means costly labour, as it may in some cases mean also more finished and artistic labour. In the production of a cheap watch it is necessary that the machine tool should be made to do as much as it is possible for it to do, so as to leave as little as possible for the file, or cutter, or polisher in the fingers of a workman. Then the production of the watch

should not be the work of different sets of workmen in different parts of the country, or in different parts of a town. If the least cost has to be reached the watch must be the result of the combination of machine and hand labour under one roof. With respect to this Mr. Hewitt's words are assuring. He says that the modern machine tools for making all the parts of a watch on the gauge or interchangeable principle can "now be bought as readily as machinery for spinning or weaving cotton, or for making boots or shoes." As any intelligent man would naturally expect, the cost of automatic and machine tools for the rapid production of the varied and numerous pieces which, when put together, form a watch, will be very great. For a factory capable of turning out 1,250 watches per week, he estimates that these tools would cost £30,000, besides the cost of fixed machinery, shafting and plant. The total sum required for such a factory he puts down at £100,000, the exact figures we had ventured to name previously. We cannot follow Mr. Hewitt when he speaks of the profits likely to be realised, simply because we are outside of the watch trade and have no intuitive perceptions of what the profits would be likely to be. At the same time Mr. Hewitt's expectations of profits do not appear to be unreasonable. At this stage a consideration of the highest importance arises. We believe there will be in Prescot now the most finished, accurate and rapid machinery, and machine tools, for the production of the skeleton movements, whilst all others required for completing a watch would have to be purchased and laid down at the factory. From Mr. Hewitt's letter it would appear that there would be no difficulty in this respect, the necessary capital having been subscribed. The importing of the machinery and tools into Prescot would be a mere trifling matter, but how about the competent skilled managers of the departments in the watch factory which would be new to Prescot movement manufacturers? The most automatic machinery will but remain lifeless and inert until it is brought under the power and control of trained and experienced men. Can such men be readily procured, and are they in such numbers that their services can be procured at reasonable rates of remuneration? When we speak of creating a new factory for the production of machine-made watches there are many questions to be answered in a satisfactory manner, and one of the number is whether the men absolutely required to preside over departments can be easily obtained at reasonable rates of pay. This is one point as to which we are sure the readers of *The Reporter* would like to hear from Mr. Hewitt. We have before given expression to the belief that there are many wealthy gentlemen in the neighbourhood of Prescot who would be willing enough to put money into a watch company, which could be shown to be likely to result in reasonable dividends. People who have thousands at their bankers yielding one-and-a-half per cent., or otherwise invested at from two to three-and-a-half per cent., are not slow to encourage healthy projects which promise something over five per cent. But their confidence is not secured, nor their money obtained, until full and complete information is given them as to all matters in which they may be in doubt or ignorance.

## Trade and Navigation Returns.

THE Trade and Navigation Returns for the month of September were published on October 7. In the imports there is a decrease of 6 per cent., but the exports have been better by 4¾ per cent. Although the imports for the month are poor, those for the nine months are still 3 per cent. better than they were a year ago. Imports have been rather declining for some time past, and exports have been mending, so that the deficiency visible in the latter earlier in the year has now disappeared, and the total for the nine months is 2¼ per cent. to the good. It is, therefore, fair to assume that the improved exports will now begin again to stimulate the lagging imports. The heaviest deficiencies in the imports of the month occurred in articles of food and drink, and in raw materials for textile and other industries. Metals alone were imported to a larger extent than a year ago, and all the leading heads of import, except metals, are liable to great variations in September. For the nine months the total trade of the country is valued as follows:—Imports, £264,437,000; exports, £163,099,000; re-exports (estimated), £44,416,000; grand total, £471,952,000. The bullion movements of the month have not been important, as measured by these returns. A notable increase has taken place in the export of "metals and ironwork."

The clocks and parts thereof imported during September are valued in the Board of Trade Returns at £33,772, in comparison with £31,179 for the same month of 1886, and £27,892 for that of 1885. The sources of the supply are as follow:—

| | 1885. | 1886. | 1887. |
|---|---|---|---|
| From France ... ... | £15,366 | £15,028 | £15,763 |
| ,, United States ... | 4,777 | 6,820 | 9,393 |
| ,, Other Countries.. | 7,749 | 9,331 | 8,616 |

For the nine months of this year the total of clocks imported show a record of £278,540, against £269,280 for the same period of last year, and £289,575 for that of 1885.

The watches and parts thereof imported last month are valued at £56,252, in comparison with £69,349 for the same month of last year, and £47,202 for that of 1885. The nine months of this year show a total value of £538,882, against £493,955 for the same period of 1886, and £448,512 for that of 1885.

The plate, plated and gilt wares exported during September are valued at £29,878. In the same month of last year the amount was £36,520, and in that of 1885 £28,442. For the first nine months of this year the exports have reached £215,554, in comparison with £254,309 for the same period of last year, and £233,420 for that of 1885.

The total value of imports for September was £27,161,594. In the same month of last year the figures were £28,898,505. The September of 1885 had a record of £29,863,788.

The exports for last month reached £19,833,830, against £18,928,975 in the September of 1886, and £18,621,664 in that of 1885.

The Diamond Industry of Amsterdam.—The Consul of the United States at Amsterdam, in his last report on the trade of the Netherlands, devotes a section to the diamond trade and industry of the Dutch capital. In 1886 the import of the "rough stuffs" was very large, but not in excess of the demand for "polished goods." The prices were higher than those ruling for some time previously; this is said to be due to the operations in the diamond fields being more expensive now than in years gone by, and also to the fact that the mines have now generally got into the hands of wealthy corporations, which put the produce in the market in such a way as to obtain fair prices. It is estimated (an accurate statement is impossible) that about 20,000 carats of rough diamonds reach the hands of the Amsterdam manufacturers each week. When finished, these vary in price from 16s. to £11 per carat, while some stones command very much higher prices. The capital invested in this trade is not all Dutch, for a very large proportion of the diamonds manipulated in Amsterdam belong to London and Paris houses. Berlin, Frankfort, St. Petersburg, Moscow, Rome, Naples, Barcelona and Madrid, as well as Paris, London and New York, are all markets for diamonds prepared in Amsterdam. Besides Antwerp the diamond industry is carried on extensively nowhere else. The trade is usually conducted on the cash system, credit being generally short. The aggregate paid in wages to diamond workers in Amsterdam is about £600,000 per annum, and it is estimated that from 7,000 to 8,000 persons are employed in the industry, and in the business of buying and selling the rough and polished stones. The wages of the men engaged in the various operations of cleaning, cutting and polishing, are decreasing, because of the constant increase in the number of skilled workmen and the never-ceasing accession of apprentices. The declared export of diamonds from Amsterdam to the United States in 1886 amounted to £275,708, but this by no means represents the total export, but those the invoices of which were presented to the Consul to be certified. A large quantity is sent to Paris and London, to be despatched to America, and many diamonds are also taken on the person.

## Pearls.

THE great development in the fashionable taste for wearing pearl ornaments of various kinds may render the following extracts from Mr. Streeter's charming book on the above subject of interest to many of our readers.

In the time of Charlemagne (born 742, died 814 A.D.), a favourite decoration consisted of large gold rings, set with precious stones and pearls, worn on the neck and arms and in the ears. The women interwove gold thread or strings of pearls in their hair, and bound fillets round their heads, which were often richly decorated with precious stones and pearls. The embroidered borders of their robes and their shoes, too, were richly worked with pearls.

The 12th and 13th centuries, the age of chivalry, were particularly luxurious, and the coats of arms worn by the knights were made of gold or silver stuff, velvet or silk, and embroidered in gold, silver, pearls or precious stones.

Pearls were used so extravagantly, not only by the nobles, but also among the middle classes, in rich towns, that certain laws were passed to put a limit to their use. Philipe le Bel of France (born 1268, died 1314 A.D.) forbade the burgher classes to wear ornaments of gold, precious stones or pearls. The Council of Zurich, held in 1411, published an order forbidding women or girls to wear more than one pearl head-band, which was not to weigh more than six ounces. Many noble families having been ruined by their excessive expenditure on clothes, a council of knights was called before the 28th Great Tournament at Wurzburg, which decided that no gold or pearl ornaments should be worn, unless hidden from view! Women also were not to have their dresses embroidered in pearls. In Saxony, even imitation pearls were forbidden; and in Hamburg, women so loaded themselves with gold and jewels that a mandate was issued forbidding them to wear more than one gold chain: copies of this mandate were posted on the town wall and at the corners of the principal streets. The church, too, preached against luxury in dress, but all to no purpose: the women continued to wear pearls and precious gems in spite of ecclesiastical denunciation. But the greatest splendour of the Middle Ages was to be seen at the court of the great house of Burgundy, from the time of Philip the Bold to that of Charles the Bold. Their magnificence far outshone that of the kings of France and the German emperors. Magnificent jewels, that can be traced back to the time of the last dukes of Burgundy, are to this day reckoned among the most valuable possessions of the crowns of France and Austria. Charles the Bold surpassed all other princes of his line in magnificence. When, in 1473, he attended the Imperial Diet at Treves, he wore a dress of cloth of gold, richly embroidered with pearls. At the banquet which he gave to the Emperor Frederick III., the goblets shone with precious stones and pearls. When in the same year he went to Dijon, he was resplendent with pearls and diamonds; and the crown which he wore on his triumphal entry into Nancy in 1475 was so covered with diamonds and pearls as to be worth the value of a "whole duchy."

At the famous meeting between Henry VIII. and Francis I. on the Field of the Cloth of Gold (A.D. 1520), the banqueting chamber was hung with tissue raised with silver, and framed with cloth of silver raised with gold; while the seams were covered with broad wreaths of goldsmiths' work, set with precious stones and pearls. When Henry VIII. met his bride, Anne of Cleves, he wore, we are told, a coat of purple velvet, embroidered in gold and clasped with great buttons of diamonds, rubies and Oriental pearls; and a collar richly ornamented with pearls and precious stones. Anne of Cleves' wedding dress was a gown of cloth of gold thickly embroidered with large flowers of pearls. Queen Mary wore at her wedding a dress richly brocaded in gold, and a train magnificently bordered with pearls and diamonds. The sleeves were turned up with clusters of gold set with pearls and diamonds. Elizabeth wore at a tournament given in Mary's reign, on December 29, 1554, a white satin dress decorated with large pearls.

Queen Elizabeth had a perfect passion for ornaments, especially jewellery of all kinds, and her courtiers were constantly impoverishing themselves in order to minister to her foibles. The costly parure of pearls belonging to the unfortunate Mary Queen of Scots, which Elizabeth bought for much less than its value, is thus described by the French ambassador at the English court: "There are six cordons of large pearls strung as paternosters, but there are five and twenty separate from the rest, much finer and larger than those which are strung; these are for the most part like black museades."

To return to the history of pearls in Europe; we find them much worn both by men and women during the 16th and 17th centuries. Marie de Medici, wife of Henry IV. of France, wore at the christening of her son (1601) a gorgeous dress ornamented with 3,000 diamonds and 32,000 pearls, valued at 60,000 crowns.

The Elector Maximilian of Bavaria, in 1635, sent his bride, the daughter of Emperor Ferdinand II., a present of a string of 300 selected pearls each of which cost 1,000 gulden (about £100).

Table decorations were also very magnificent at that time, and Charles II. of Spain, in 1680, presented his wife with an ornament in the form of a salad, in which the leaves were represented by enormous emeralds, the vinegar by sparkling rubies, the oil by yellow topazes, and the salt by pearls.

Notwithstanding the dire consequences of the Thirty Years' War, immense sums were expended during the 17th century upon ornaments and luxury of all kinds. Knightly orders, sword and hat knots, rings, shoe buckles, waistcoat buttons—all glittered with gems. The stomacher and the enormous collar and ruff, both richly trimmed with pearls and jewels, were also introduced about this time. In the 18th century precious stones were less lavishly employed, especially after the French Revolution, and dress in general came to be characterised by greater simplicity.

## The Use of Gold for Ornaments.

THE most interesting question of all about gold (says the *Cornhill Magazine*) is, how did it come to be the root of all evil? What has made this particular yellow metal, above all stones and minerals, the standard of value, the medium of exchange, and the object of all men's ardent devotion? In order to solve that curious problem we must look at the origin of its use among mankind and the gradual evolution of its employment as money. Primitive man, hunting about in the rivers for fish and in the forests for venison, had other wants (philosophers tell us) than those of mere vulgar food and drink; the noble thirst for trinkets, the æsthetic desire for personal decoration, which now gives rise to fashion plates, and drapers' shops, and jewellers' windows, was already vaguely alive within his swelling bosom. He adorned himself even then with necklets of bears' teeth and shining fossils, and girdles of shell and bits of vampum: all which things are found, in company with the white chalk and the red ochre that made primitive woman beautiful for ever, among the coveted flowers of the Dordogne caverns. Primitive woman was not fair to outer view as other maidens be; on the contrary, she was no doubt distinctly dark, not to say dusky—somewhere about the precise complexion of the modern negress, her nearest surviving representative—but already she knew how to keep in the fashion; she loved gold (as Walpole long afterward remarked of her remote descendants), and, when she could get them, diamonds also. Ages before any other metals were melted or manufactured into useful implements, gold and silver had attracted the attention of our savage ancestresses. There was every reason why this should be so. They are generally found in the native state; they have glitter and brilliancy and beauty of colour; they are soft and workable and easily pierced; they can be readily strung in ingots, as beads for necklets, and at a somewhat higher grade of culture they can be hammered with ease into rude ornaments. Hence it is not surprising that from a very early age primitive man should have prized nuggets of gold and ingots of silver for personal trinkets, just as he prized the shells and pebbles, the garnets and cornelians, the jade and crystal, the ivory and feathers, from which he manufactured his rude ornaments.

# The Merchandise Marks Act and the English Watch Trade.

By David Glasgow, V.P. British Horological Institute.

As the question of the Merchandise Marks Amendment Act has lately been exercising the minds of watchmakers, it may be interesting to some of your readers if I give a short outline of the movement that has resulted in this rather ambiguous measure; at least, in that part of it relating to watchmaking.

A few years ago the Council of the Horological Institute, seeking some means of reducing the cost of the production of English watches, to enable them to compete with the Swiss, thought that the Swiss had a great advantage in the almost nominal control of the Government over the quality of the gold in the cases of watches, and also in the liberty they had of putting metal domes to their cases. The Council asked for an interview with the Wardens of the Goldsmiths' Co., which was granted, and an influential deputation of watchmakers waited upon them at their hall, stating their grievances and requesting a reformation in the manner of scraping and stamping gold watch cases; also complaining of the charges for the same, and other matters. The deputation (as usual) did not agree as to their wants or on the modes of redress. Two well-known shopkeepers wished to abolish Hall-marking altogether, as a survival of the feudalism of the Middle Ages, while others thought the marking of watch cases should be made optional as the marking of most articles of jewellery is optional. The Company took the matter up at once, and sent an assayer to Paris to ascertain the French mode of assaying and marking watch cases, which had been represented to them as superior to that practised here. The Company declined to use the French plan; but they so far acceded to the wishes of the deputation, that a marked improvement in the treatment of cases sent to the hall was the immediate result. This more delicate handling of cases at the hall enabled the Swiss to send their light cases to be marked here, although the Swiss system of testing and marking was both cheaper and simpler than that of our halls, the presumption being that a Swiss watch with the English Hall-mark in the case would sell for more than if the watch was purely Swiss.

This facility for marking Swiss cases, and threats by some of the watchmakers that they would have their cases made in Switzerland, alarmed the case makers, who immediately began to agitate for a measure to abolish the Hall-marking in England of foreign-made watch cases. Coventry and Lancashire came to the assistance of the London case makers, and of course enlarged their demands so as to meet their own wants; they not only asked for the abolition of the Hall-mark on foreign-made cases, but for an Act which would prohibit the use of any foreign materials or parts in the manufacture of English watches. As the art of making the repeating or clock part of repeating watches and other parts of complicated mechanism for watches had long been located in Switzerland, and the last repeating-motion maker in England had been dead for the greater part of a century, it was felt by many people that these demands were not in accordance with the spirit of the times, and were rather retrograde; but Sir Henry Jackson, who was then Member for Coventry, being persuaded by his constituents, took the matter in hand, and obtained a Committee of the House of Commons to inquire into the Hall-marking of gold and silver wares.

This Committee sat for some time, examined many witnesses, and gave the House of Commons the benefit of their deliberations in a report, on a part of which Sir Henry Jackson framed a Bill which was before the House for part of two sessions. This Bill provided that all foreign-made watch cases should have a distinctive mark put on them, in addition to the usual mark, and that the distinctive mark should indicate the country of origin; also that no foreign materials or parts should be used in the manufacture of English watches under some very severe penalties. But this Bill met with much opposition, both from Members of Parliament and the watch trade, and so it was dropped. Somehow, up to the date of this agitation, there had been no complaints here of the sale of Swiss watches as English; and the imitation of English watches by Swiss manufacturers was not urged in favour of Sir Henry Jackson's Bill, although it was shown in evidence before the Committee, by those opposed to the Bill, that it had long been a practice of the Swiss, not only to imitate English watches, but to forge the Hall-mark and the names of almost every English watchmaker who had a reputation in countries out of England: but as this piracy only affected a few people they had to put up with it.

From that time the number of watch cases of foreign make marked at the Goldsmiths' Hall increased considerably each year, and the rapid popularity of keyless watches with going barrels, and the adoption by the Swiss of the lever escapement to their commoner watches, tended to assimilate the character and appearances of Swiss and English watches. A still further development of this similarity was brought about by the manufacture of movements in Switzerland in exact imitation of a Lancashire keyless movement, when, of course, if these movements were finished in Switzerland and placed in English Hall-marked cases only an expert could tell the difference between such watches and those finished here.

I think the question is likely to occur to some—Then what is the difference if it is so hard to detect? The difference is in the word finishing, as these movements only cost as many shillings as the completed watch costs pounds. The difference in the quality of the watch is easily accounted for, and the importer has assured me that he can make watches from these movements in England at the same or even a less cost than he can have them made for in Switzerland, if the quality of the work is equal. But although it requires an expert to see the difference in the external appearances of these English watches and the Swiss imitations of them, the difference is easily detected if they are taken to pieces, as, like all imitations, they are very much inferior to the originals. But as they were much lower in price than English watches, they were spread all over the country; and I have it on good authority that there are few watchmakers in the provincial towns who have not some of these watches with their names upon them: and the London shopkeepers have been trading in the same articles, with, of course, some exceptions.

The injury thus inflicted upon the English watchmakers became so serious, that they were quite ready to adopt any measure that promised to relieve them by putting a stop to so nefarious a system. So a public meeting was called at the beginning of last year, at the Horological Institute, under the presidency of Lord Grimthorpe, at which several Members of Parliament attended, and resolutions, carefully drawn up, were passed, condemning the practice of selling Swiss watches as of English make, and asking for legislation to prohibit the English halls from marking Swiss cases, to the injury of both the trade and the public; but these resolutions were not sufficiently strong for the deputations from Coventry and Lancashire and a great many of the Clerkenwell workmen, who formed associations and fell back on the Bill of Sir Henry Jackson, with all its prohibitory clauses, its affidavits and penal enactments.

It would not be either amusing or instructive to make any comment on the Bill in its present form, as portions of the Act which apply to our trade have not yet come into operation. Some of the clauses have to be regulated by an Order in Council, and this order will not be issued until all necessary preparations are made; these preparations I understand to be the agreement as to the form of the stamps that are to indicate the origin of the work and the preparation of the same. I would not like to prophesy, but I do not think the halls in England will be troubled with much Swiss work, if they impress such a legible mark upon watch cases as will attest their origin at first sight. While I am greatly pleased that some means have been found of putting a stop to a system which was defrauding the public and demoralising all who had a share in it, I feel sure that to carry out the clauses of the Bill in the spirit of a circular issued by the Clerkenwell Watchmakers' Protection Society is impossible, and if possible, would be ruinous to the trade, the welfare of those engaged in it being what we have to consider above all local interests. Then may I ask—Will the enforcement of these

clauses that interfere with the freedom of English watch manufacturers, and prevent them making up repeaters and other complicated watches, reduce the price of our manufactures, or enable us to compete with foreigners in foreign markets who are now able to undersell us in certain classes of goods in our own? I have seen, lately, watches made in Coventry, both by the splendid machinery of the Messrs. Rotherham and others made on the old system, and for quality and price they would compare favourably with any watches I have seen; but on inquiring into the condition of the producers of the latter, it was quite evident a decent existence could not be maintained on their earnings: therefore, competition with foreigners under such circumstances is neither desirable nor possible. Instead of relying on our old system for the production of our commoner watches, we must leave that branch of the trade to the now various establishments in the country and London (that are either in existence or in embryo for the manufacture of watches, principally by machinery, who are well able to take care of themselves); and as the producers of high-class watches, take care that we do not lose the men and consequently the power of still making watches that will maintain our old superiority, and that the world cannot beat.

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Two Methods of Welding Metals by Electricity.—This comparatively new application of electricity is one that has an interesting future before it. The processes of welding metals by electricity at present known, although producing an undoubted closeness of adhesion, cannot boast of the same amount of strength or tenacity obtained by the ordinary method of welding or by riveting; the latter quality will no doubt in time be attained also by the inventors. One method is that of the Russian inventors, Messrs. Nicholas de Bernados and Stanislas Oszewski, of St. Petersburg. It consists of the direct application of the luminous arc of a dynamo-machine. The pieces of metal to be united are tightly pressed together by means of an iron clamp which is connected with the negative pole of the machine, the positive pole being connected with a suitable non-conducting handle to hold the carbon point, which is passed over the adjoining portions of the two pieces of metal; fusion immediately takes place and the welding is accomplished. The handles for holding the carbon point are contrived both to be guided by the hand and to be mechanically moved, according to the nature of the work. For long joinings of metal plates, for instance, a sliding runner is used to carry the point evenly along. The inventors of this process have already established a small workshop in St. Petersburg with a 25 horse-power dynamo-machine, and have recently exhibited its working to representatives of the iron industries, practically demonstrating to them that metal plates, bars, &c., can be thus satisfactorily and expeditiously welded. Articles of hardware, such as kettles, saucepans, &c., were also made by the process in substitution of soldering, iron plates of various thicknesses being used. Iron sheeting of one-eighth-of-an-inch admits also of holes being bored through it by the passage of the electric current. Petroleum casks are some of the chief articles the workshop is at present employed in making, of which it turns out ten to twelve daily, the process being particularly applicable to the joining of vessels where no possibility of leakage can be allowed, on account of the perfect contact it produces. The number of applications in store for the process are of course innumerable, supposing that the inventors succeed in combining with the present quality of close cohesion that of great tenacity, a difficulty they are in hopes of surmounting. Another method of electric welding is that of the American inventor, Mr. Elihu Thomson, which consists, not like the above described, of the application of a luminous arc, but of simply passing the electric currents through the metals to be joined. He uses a dynamo, producing alternating currents of great tension, which are converted by a transformator into a current of lesser tension but condensed quantity; the parts to be welded being, as before, closely clamped together. This process is more adapted to the welding of metal bars, tubing, steel tops to tools, &c., than to sheeting or plates, and, for general utility, holds a place second to the Bernados-Oszewski method.

# The Lever Escapement

## CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. Grosclaude, Professor at the Geneva School of Horology.

*(Translated from the French.)*

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THE lever escapement is undoubtedly that which, up to the present, tends more and more to supplant the others in pocket watches that are intended to perform with exactitude. This has been proved to us in all the recent trials at the observatories, where the great majority of the pieces have been provided with this escapement. It is not, then, surprising that its adoption should be so general, nor that so much should already have been written and discussed upon its construction.

Our aim in taking up this subject in our turn is more especially to pass in review the different points which may have an influence upon its good construction—to point out their reciprocal advantages and the importance that should be accorded them. Those who will follow us closely will find in the following pages, we think, some novel details, but also many others that are not so. We have not, therefore, the pretension of diminishing in anything the merit of those who have preceded us in this way; we have simply essayed to go a step further in this question, already so well considered, both in a general manner by M. Grossmann and by many others from special points of view.

Our intention is to consider the plan of the lever escapement under different aspects: it is thus only that it is possible to base an accurate judgment and to make a judicious choice—this subject, like so many others, having a certain number of different conditions which should all be carefully examined. It is only after having well weighed the *pros* and *cons* that we can, in discussions of this kind, arrive at anything satisfactory.

We propose, then, in the first place, to determine a general procedure for the form of this escapement; then we shall examine it with regard to the impulse, the influence of oils, the inertia of the matter, and, lastly, the friction.

We shall endeavour to be brief, without in the meantime neglecting to dwell upon certain points which, in our opinion, do not appear sufficiently well understood by a large number of practitioners. We do not wish it to be thought that we have any pretension to completely settle the complex question, but hope we shall succeed at least in introducing to the subject some useful *éclaircissements*.

Lever escapements may be classed in different categories, as follow: 1st. The distance of the rest with regard to the centre of the anchor (levers,* or equidistant lockings); 2nd. The number of teeth of the wheel; 3rd. The distribution of the incline (all on the anchor, or divided between the anchor and the wheel in different proportions); 4th. The total angular movement of the anchor and the locking angle; 5th. The drop.

The determination of all these quantities rests at the choice of the constructor; and here he will be influenced by very diverse considerations, some of which will be treated of later on.

In considering the plan of the escapement we shall accept the following data, which, if necessary, may be modified:—

An escape wheel of fifteen teeth: consequently, a total angular movement of the wheel for each impulsion, 12°; Total angular movement of the anchor, 10°; Movement of the anchor necessary for unlocking, $1\frac{1}{2}$°; Drop: 1st, for escapements with club-toothed wheel, 1°; 2nd, for escapements with ratchet-toothed wheel, 2°.

We leave the other data variable; meanwhile our study will bear especially upon the four following systems:—

1st. Equidistant lockings, pointed teeth, the wheel travelling over 10° during the impulse, and the drop being 2°.

2nd. Equidistant pallets, pointed teeth, same movement of the wheel, same drop.

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* We substitute for the term generally and improperly applied, "lift" (*levée*), that of "lever" (*levier*), to designate the jewelled pieces upon which the teeth of the wheel act; the word "lift" being reserved for the angular movement of the anchor.

3rd. Equidistant lockings, lift divided—taking 4° for the width of the tooth, 7° for that of the pallet, and 1° for the drop: total, 12°.

4th. Equidistant pallets, lift divided, the same distribution for tooth and pallet as in the preceding case.

*Plan of the escapement with equidistant lockings and pointed teeth.*—Describe a circle *a b a' b'* (fig. 1) to any scale. Draw three radii, *oa*, *or*, *oa'*, at distances apart of 30°, since the opening which corresponds to two-and-a-half teeth of a wheel of fifteen teeth is 60°. At the ends *a* and *a'* of the two extreme radii draw

*Fig. 1*

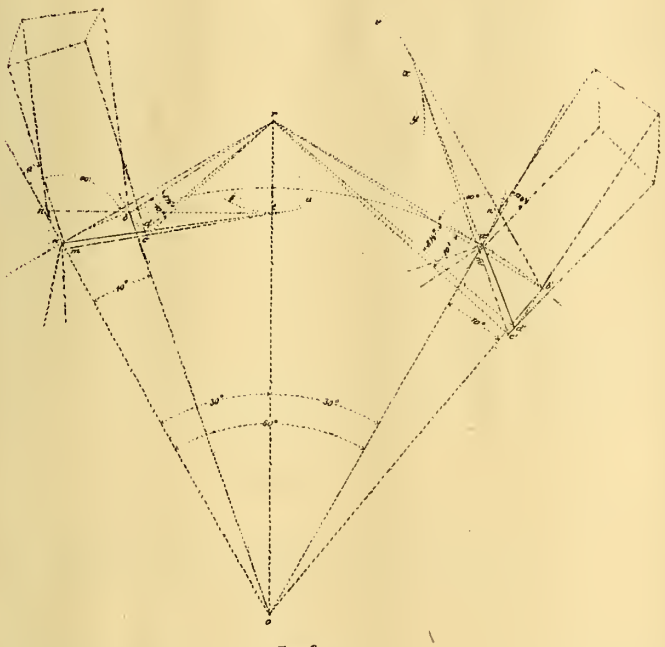


*Fig. 2*

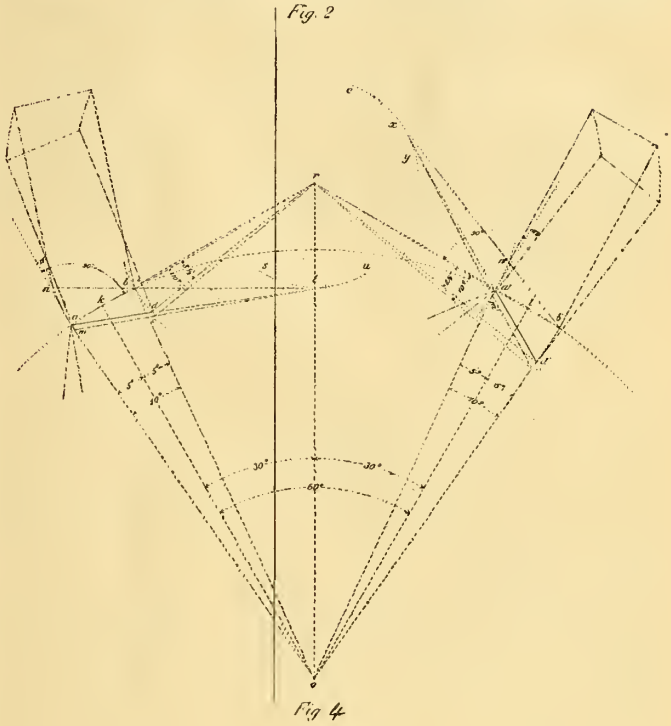


*Fig 3*

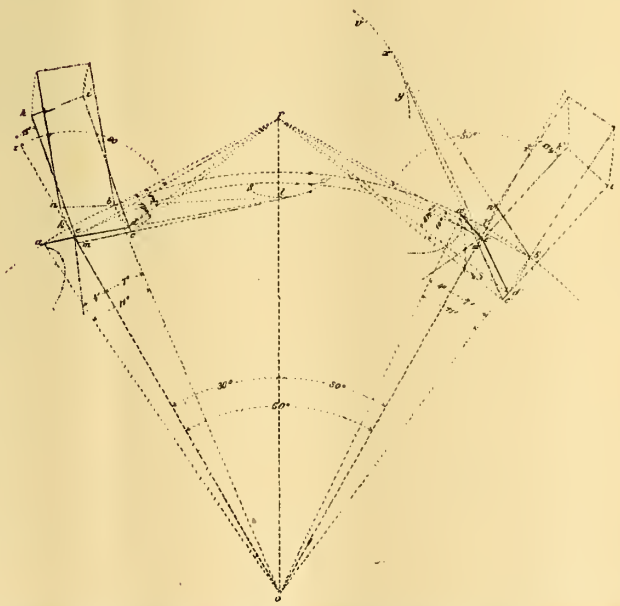
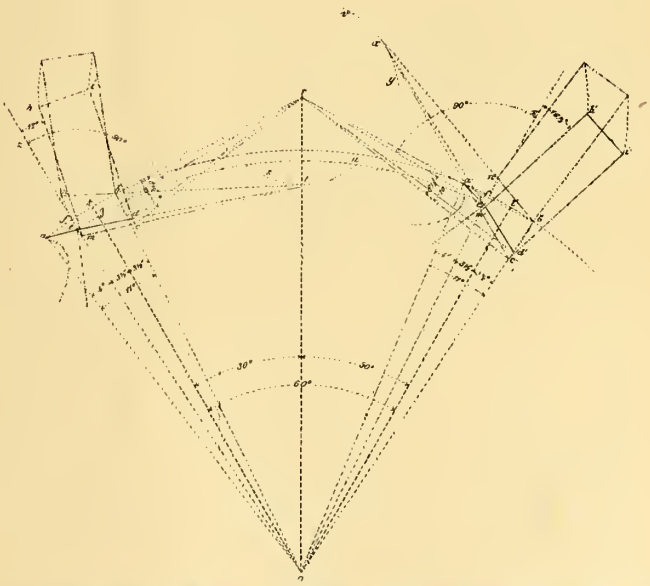


*Fig 4*



two tangents: the point of intersection upon the intermediate radius, produced, gives the centre *r* of the anchor.

For this escapement the point *a* (if we confine ourselves at first to the entering lift (*levée d'entrée*) is the point of the tooth. To find the heel* of the pallet turn the point *a* 10° around the centre of the wheel to *b*, then 10° (total angle of lift of the anchor) around the centre of the anchor to *c*, and, lastly, turn it back $1\frac{1}{2}$° (amount of penetration of the locking) to *d*. The junction of the point *d* with the point of departure *a* gives us the incline of the pallet. Therefore the point *b* is where the tooth will leave the incline, because to arrive there it has travelled 10°; there then remains 2° for drop, and the point *c* will have traversed in all 10° to come to *b*.

Produce the line *a d* and describe the tangency circle *s t u*. The tangents passing by the points *c* and *b* give us the incline in its two extreme positions with regard to the wheel. As regards the exit lift (*levée de sortie*) the same process is observed: The point *a'* is first taken 10° around the centre of the wheel to *b'*, then 10° towards that centre around the centre of the anchor to *c'* and brought back again $1\frac{1}{2}$° to *d'*; the line *a' d'* will be the incline of the exit pallet. The tangency circle *v x y* will serve to draw this incline in any desired position between the two extreme positions.

*Plan of the escapement with equidistant pallets and pointed teeth.*—To set out the second escapement in our above classifi-

* The part of the tooth that comes first in contact with the pallet is usually termed the point, and the part which actuates it the heel (*talon*). We shall, therefore, in order to facilitate description, apply "point" and "heel" to the parts of the pallets which come first and last into action respectively. The impulse begins, then, by the contact of two points and terminates in that of two heels. It is hardly necessary to say that, as regards the pointed tooth, the point and heel are identical.

cation exactly the same process is gone through, save that since the pallets are equidistant and correspond to 10° of the wheel, the point for the tooth *a* (fig. 2) is taken 5° to the left of the radius *o k*, from there 10° to *b*, then 10° interiorly to *c*, and, being turned back again 1½°, brought to *d*, as before; *a d* will be the incline. At the exit lift take the point *a'*, similarly, 5° to the left of the radius *o l*, and proceed in the same way; that is to say, bring it at first to *b'*, then to *c'*, and lastly to *d'*; the incline of the exit pallet will be *d' a'*.

The question of "draw" has been designedly left aside until we have finished with the inclines.

*Plan of the escapement with equidistant lockings and club teeth.*—We have already seen that the angular movement of a wheel of fifteen teeth is 12° for each impulse. As the club tooth allows of the pallet freeing it easier at the back than in the case of the pointed tooth, we shall only take here 1° for the drop instead of 2°. There remains, therefore, 11° which may be distributed according to taste between the incline of the tooth and that of the pallet. We have selected 4° and 7°; had we desired a tooth almost as wide as the pallet, we could have chosen 5° and 6°, or any other optional proportion.

Describe a circle *a k b a' l' b'* (fig. 3), representing the exterior size of the wheel. In order to obtain the centre of the anchor it is necessary to find the point of the tooth, seeing that up to the present it has always been considered best that the centre be upon the tangent to the circumference which touches that point (we shall see later on the importance that should be given to this detail). To be able to proceed then, take a provisional centre of the anchor *r* as nearly as possible in its proper place. We can never be far out in this, as we know it should be a little nearer to the wheel than that which was found for the ratchet-toothed wheel. In any case an error of judgment in this respect can readily be corrected.

Since equidistant lockings are required, take, starting from the point *k*, a point *a* making an angle of 4° with this last, the centre *o* of the wheel forming the summit of the angle.

Mark a point *b* 7° from *k* or 11° from *a*, then with the centre *r* of the anchor as centre, carry the point *b* 10° inwards to *c* and again recoil it 1½° to *d*, as 1½° is always required for the locking.

If now the point *a* be joined with the point *d* by any line or curve, the condition will be effected as regards the anchor having an angular movement of 10° for its total movement and of 1½° for attaining the position where the inclines can act upon one another. This allows of any form of incline being selected without destroying our proposition.

Assuming that we have chosen the broken line *a e d*, the part *a e* will be the incline of the tooth, and the part *e d* the incline of the pallet. Produce this last and describe the tangency circle *s t u*; two tangents, *c* and *b*, to this circle will give the innermost and outermost positions of the incline.

A line touching the point *e* of the tooth perpendicular to the radius of the wheel touching the same point can now be drawn, which will enable us to find the centre of the anchor; if the provisional centre is appreciably out of its proper position the drawing must be done over again; but the point *b* will not change its place and only the points *c* and *d* will require to be moved. From the centre *r* describe the arc *b d c*, which most frequently will only imperceptibly modify the points *c* and *d*, even in a drawing on a very large scale. It is thus apparent that selection of a provisional centre of the anchor does not present any serious inconvenience, while at the same time it affords a uniform means of drawing different systems of escapements; and it will be seen later on the advantage there is in placing the centre of the anchor upon the tangent which passes by the point of the tooth. As regards the exit pallet, take in the same manner a point *a'* 4° to the left of the equidistant radius *o l'*, the point *b'* 7° to the right; find a point *c'* and a point *d'* at 10° and 8½° by turning around the centre of anchor towards the wheel. Here the points *a'* and *d'* can no longer be joined by any straight line, the incline of the tooth being already determined. Move then the point *e* through an arc of the circle to *e'* and join *e'* and *d'*. Producing this last line the tangency circle *r x y* is obtained and the incline of the exit pallet, in its interior position, *m' c'*, and in its exterior, *n' b'*, drawn.

*Plan of the escapement with equidistant pallets and club teeth.*—The directions given for drawing the preceding escapement serve, with a little modification, for this one, so it will only be necessary here to generally indicate briefly the mode of procedure without going into details.

Assuming that the tooth is to be four-sevenths the width of the pallet, as before, take two points, *f* and *b* (fig. 4), 3½° to the left and right of the equidistant radius *o k*, and mark the point *a* 4° still further to the left; this will be the heel of the tooth. Turn the point *b* 10° and 8½° around the centre of the anchor and join *d* and *a*; this gives *a e* for the incline of the tooth and *e d* for that of the pallet. Try if the centre of the anchor be upon the tangent passing by the point of the tooth, and correct it if it is not. This tangent for the escapement with equidistant lockings cannot, as is shown in the drawing, be ascertained by the point of the tooth, because it would not intersect upon the line of centres the tangent passing by the point of the tooth in the exit lift. The point *g* on the equidistant radius *o k* takes the place of the point of the tooth, and from this point the perpendicular is drawn for obtaining the centre of the anchor.

At the exit lift take in a similar manner the points *f'* and *b'* 3½° to the left and right of the equidistant radius *o l'*, and the point *a'* (heel of the tooth) 4° further to the left. Turn the point *b'* 10° and 8½° and join the point *d'* with the point *e'* of the tooth which had been carried over when previously drawing the entrance lift. By the same system of tangency circle the incline of the pallet may be drawn in any desired position.

*(To be continued.)*

## Four Large South African Diamonds.

By George F. Kunz, New York.

A MODEL of the Victoria (the great White Diamond), or the Imperial, as it has been more recently called, having been sent to this city lately, and nothing having been published in any scientific periodical concerning this stone, it occurred to the writer that some particulars concerning its natural uncut form, as well as after cutting, might be of interest. Concerning its early history very little is known; in fact, where the stone was found is only a matter of conjecture—a remarkable circumstance when we consider that this is the largest brilliant in the world.

An explanation by a letter in the *Times* was given as follows:—"That this stone was not found in English dominions at all, but in the neighbouring Orange Free State; that it had been found by a Boer on his farm, who, knowing it to be a diamond, but fearing being turned out of his farm by a mob, kept the secret a whole year, until a Mr. Allenberg, of Port Elizabeth, saw it and forwarded it to London."

It is, however, believed that it was found by someone in one of the Kimberley mines, South Africa. The first intimation that any of the various mining companies had of its existence was when they heard of its safe arrival in London. It is generally supposed that in the month of June or July, 1884, the stone had been found by one of the surveillance officers of the Central Mining Co. in the Kimberley mines. It being his duty to search others, he had the privilege of not being searched himself, and so the stone was passed through the searching-house, and he was afterwards supposed to have found means of communicating with four illicit diamond buyers. Owing to the stringency of the diamond laws of Griqualand West, the trading in rough diamonds is forbidden anyone not owning one of the "patents" or "licences" as they are called, costing £200 and a guarantee of £500. All purchases made by them must also be entered in a special registry, and are duly signed every week by the police authorities. £3,000 was the price paid to obtain the stone from the first possessor. To prepare themselves for the ordeal of transporting the stone out of the district they assembled at

night, commenced drinking, then gambling, and, after a night's debauch, two of the party lost their share in the big stone. The other two reached Cape Town in safety, where the diamond laws are not in force, and from a dealer there received £19,000 in cash for their stone. An outward duty of one-half per cent. is collected on all shipments of diamonds from Cape Colony; but this diamond is said to have been carried by one of the passengers of a mail steamer, and was hence undeclared.

We next hear of it in London, causing considerable sensation at Hatton Garden, the great diamond market. After considerable time had been spent in trying to find a capitalist who could afford to buy such a gem, it was at last arranged by a former resident of the Cape mines to form a company of eight persons, who bought the stone together for £45,000 cash, on condition that if they should dispose of it, each should receive a ninth share in the eventual profits.

Before cutting it was estimated that the crystal would furnish either of the following gems: If cut as a briollette, 300 carats; as a drop, 230 to 240 carats; as a lozenge, 250 carats; and as a mathematically perfect brilliant, 150 carats. If cut in the latter form it would have furnished cleavages that would cut into one 40 carat, one 20 carat stone, and 40 carats of smaller stones. It was finally decided to cut it into the largest possible brilliant, still preserving a good shape, and Amsterdam was selected as the place where the gem could best be cut.

It was accordingly sent to the polishing mills of Jacques Metz, who erected a special workshop for the purpose. In order to better obtain the brilliant form of cutting, a piece was cleaved off which furnished a 19-carat diamond, and was sold to the King of Portugal for £4,000. The cutting of the large stone, which was commenced on April 9 in the presence of the Queen of Holland, took about twelve months, since, instead of being cut by abrasion with another diamond, as diamonds are usually cut, it was polished down on the scaif; and a great amount of time was consumed by the cooling of the stone, as it heated after an hour's running on the wheel. The cutter of the stone was M. B. Barends. The stone in its finished condition weighs 180 carats, is a beautiful, perfect steel-blue diamond, and is the largest brilliant in the world.

It is 39.5 mm. ($1\frac{9}{16}$ inches) long, 30 mm. ($1\frac{11}{64}$ inches) wide, and 23 mm. ($\frac{15}{16}$ of an inch) thick, being exceeded in size by one diamond only, the Orloff, belonging to the Russian crown, which weighs $194\frac{3}{4}$ carats, but is a large deep rose, and not a brilliant. The Victoria exceeds the Regent in weight by $44\frac{1}{8}$ carats. The Koh i-noor weighs only $106\frac{1}{16}$ carats.

The form is not entirely even, and on one side of the girdle there is quite a flat place, a natural unpolished surface, necessary, in cutting, to preserve the large weight of the stone. It is, however, a perfect 58-facet brilliant.

The original weight of the stone was $457\frac{1}{2}$ carats—over 3 ozs. troy. The stone to-day is held by a London syndicate for £200,000. The ownership is divided into 32nd parts, some holding only one and others four or more.

The Tiffany large yellow diamond weighs $125\frac{3}{8}$ carats, is absolutely perfect, is a "double-deck" cut brilliant, as it is termed, and is undoubtedly the finest large yellow diamond known. It was found in the Kimberley mine about nine years ago, and was cut in Paris. One of its most pleasing features is that it not only retains its rich yellow colour by artificial light, but is even more beautiful than by day. It has 40 facets on the crown, 44 facets on the pavilion or lower side of the stone, and 17 facets on the girdle: total number, 101. Because of its deep colour this is a finer stone than the historical Star of the South (125 carats), which was purchased by the Mahratta, ruler of Baroda, for 400,000 dols., at the French Exposition, 1867. It also rivals the Florentine, which, according to Schrauf's determination (*Sitzb. d. k. Akad. d. Wissench.*, Band 54, Abtheil i. Nov., 1866) weighed $133\frac{3}{5}$ carats, and was sold for 2,000,000 florins, but is only a long double rose or drop, and not a brilliant.

The Tiffany No. 2 diamond weighs 77 carats, is of a light yellowish colour, is absolutely perfect, and is one of the few large stones that have been cut for beauty and not for weight. It is so evenly cut that it will stand on the eulet, which is only of the regular size. This stone was exposed to a strong blazing sunlight for 30 minutes, two thermometers registering 110° to 120° F. during the whole time of exposure; and only a very faint, if any, phosphorescence was observed, although the stone was placed in a dark room within 30 seconds after exposure. It had been laid on a black velvet case during the whole time of the experiment, and nothing came in contact with it while it was being carried to a place of darkness. Its specific gravity is 3.523+ at 60° F.; it measures 26 mm. ($1\frac{1}{32}$ inches) in length, 25 mm. (1 inch) in width, and 17 mm. ($\frac{11}{16}$ of an inch) in thickness; there are 33 facets on the crown or upper side of the stone and 25 facets on the pavilion or back; and, in addition, there are 55 small facets evenly distributed around the girdle.

A fine yellow diamond, weighing $51\frac{1}{8}$ carats, also from South Africa, and recently recut by Tiffany & Co. in New York City, is absolutely perfect and without flaws. It measures 22 mm. ($\frac{7}{8}$ of an inch) in length, 22 mm. in width, 23.75 mm. ($\frac{31}{32}$ of an inch) at the corners, and 15.75 mm. ($\frac{5}{8}$ of an inch) in thickness; there are 73 facets on the crown or upper side of the stone, and 49 facets on the pavilion or back; and the cutting, which is that of a double-deck brilliant with some of the lower crown facets divided in two, is quite unique, forming a remarkably beautiful gem.

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Madagascar Trade in Watches and Ornaments.—There are in Madagascar, writes a correspondent, no special dealers in watches and ornaments, these goods being kept by most of the traders as supplements to their stocks, and their sale is principally amongst the European circles of inhabitants. As mantlepieces are unknown in the island, there is no demand for the ormolu class of clocks, candlesticks, vases, &c., which are so commonly in request in England; but small timepieces, inkstands and such like for writing tables are very saleable. There is also a fair demand for travelling clocks with or without alarums, and such goods may with safety be shipped to Tamatave on consignment. Massive gold watches of medium quality (especially keyless ones) and large and showy chains with pendants are very marketable goods; the same can be said of nickel and aluminum-cased keyless watches, but these latter should only be sent out if their winding gear is of reliable make, for should an article of this kind get a bad name through a few purchasers being let in, a whole consignment will probably be doomed. Exporters should remember that in sending goods to out-of-the-way places with limited populations, their sale is readily affected by a bad reputation, chance custom being a much less important factor here; neither should it be forgotten that cheap mechanical articles, whose prices in the country of manufacture are so low as hardly to make it worth purchasers' while to complain if they turn out badly, by the time they are offered to retail purchasers in the above-mentioned places have their prices increased 100 per cent. or more, and a greater importance is attached to the purchase. It is therefore an error to export this class of manufacture in the lowest qualities. The same remark applies to gilt or plated goods, which should always be of a moderately fair quality at least, and not mere wash, if anything like a continuous trade is wished for. When a Madagascan, or say an Otaheitian, indulges himself in a splendid gilt warming-pan cased watch or princely looking chain, paying, as he would have to, a by no means inconsiderable price for the gratification, his mortification will be great on finding the glitter all gone after a few weeks' wear, or that the keyless movement of his wonderful watch has broken down; and he does not, as an Englishman would do similarly circumstanced, keep the article out of sight and say nothing about it, but protests loudly to everyone he meets against the manner in which he has been "swindled," and makes others suspicious of the manufacture. The women in Madagascar, both Europeans and natives, have a great aptitude for adorning themselves with jewellery, choosing not the gaudiest patterns, but for the most part showing good taste; and medium quality gold necklets, bracelets, earrings, hairpins, &c., will always find ready purchasers. The import duty on these goods is 10 per cent. on declared value.

# American Items.

Mr. Charles L. Tiffany, one of the founders of the house of Tiffany & Co., which reached its 50th anniversary on September 21, was presented with a handsome testimonial or address from his employés on that occasion. The address was an illuminated one on vellum, consisting of eleven large sheets attached to an ivory roller. It was encased in a finely polished rosewood case, with a solid gold plate on top, bearing the inscription, "Charles L. Tiffany, 1837—1887."

The Canadian Government has recently taken to seizing all catalogues, price lists, &c., that are sent into the Dominion by mail and levying a duty on them. A dealer in machinery complains that a catalogue sent by him to Hamilton, Ontario, was so seized, and on his writing to the collector at that place he was informed that all such publications were dutiable. This is rather a petty business (says the *Jewelers' Circular*) for a great government to indulge in. It has always been represented that Canada desired to cultivate the closest commercial relations possible with us, and our people have reciprocated that sentiment fully; but if such paltry hindrances as this are to be thrown in the path of trade and commerce, it is not likely to be developed very rapidly.

Says the *Jewelers' Circular*: Manufacturers and jobbers alike have been kept unusually busy during the past month, and no one is now heard complaining of dull times. The universal response to the inquiries regarding trade is, "never better;" and instead of the former complaints of dulness, with which we have been so familiar in previous years, the grumbling, when there is any, is because of overwork. One extensive jobber informed us recently that his business for the first eight months of this year was 40 per cent. more than it was for the corresponding months of last year; and that if he were to close up then he would be ahead of last year's business, so far as the quantity disposed of was concerned. Others speak with nearly equal satisfaction as to the condition of trade; and unless something unforeseen occurs, the quantity of goods sold will be largely in excess of the sales of 1886. But there comes in the old cry regarding excessive competition, and the cutting of prices till the margin of profit is whittled down to a point that is almost indistinguishable. A large manufacturer of a general line of jewellery informed us that his firm kept a large force employed in making chain; yet he did not believe that they had made a dollar on chain in several years, because the prices had been cut away until there was scarcely enough left to pay for material and labour. When asked why he continued to make goods on which there was no profit, he replied that they were obliged to in order to keep up their stock and sell their other goods. Their customers demanded full lines; and so they had to go on making chain and to sell it without a profit, because the competition was so great that prices were cut all to pieces. He was certain that he could make chain as cheaply as anyone, and if he could not make a profit out of it he was sure no one else was getting rich by it. So it is with other goods, and the general feeling seems to be that the profits of the business this year will not be commensurate to the quantity of goods sold. It is something, however, to have sold the goods.

# The Watch Trade and the Merchandise Marks Act.

A meeting was held on Tuesday, the 11th ult., at the offices of the London Chamber of Commerce, Botolph House, Eastcheap, of watch importers and manufacturers, for the purpose of receiving a report "As to the bearing of the Merchandise Marks Act, 1887, on the watch trade." Mr. L. Platnauer presided, and there were present: Mr. J. Rotherham, Sir John Bennett, Mr. E. J. Leyard, Mr. M. A. Perrier, Mr. J. Tripplin, Mr. J. Elkan, Mr. T. Wordley, Mr. T. W. Vine, Mr. J. A. Lund (Messrs. Barraud & Lund), Mr. J. L. Langman (Goldsmiths and Silversmiths' Co.), Mr. H. M. Frodsham, and others. The Secretary (Mr. Kenrie B. Murray) read the report and opinions obtained from reliable sources, which showed that the Merchandise Marks Act appears to apply to the watch trade except in regard to those matters which are to be regulated by the future issue of an Order in Council; that this Order in Council will not be issued until all necessary preparations have been made; that while the English Hall-mark does not rank as a "trade mark," it does rank as a "trade description," and consequently nothing must be placed upon a watch tending to mislead the public as to its origin; that the Act will apply to existing stocks without any allowances, but that if watches Hall-marked prior to the passing of the Act are sold on a special declaration of their origin the spirit of the Act will be complied with; the declarations at an assay office as to origin of watches and cases will immediately on the issue of the Order in Council have to be made in person, or by an accredited representative; that the most convenient possible arrangements will be made by the authorities: and that new stamps were proposed for marking watches, different and distinctive from gold and silver.

The Chairman said the meeting would recognise the value of the means by which they could legitimately dispose of present stocks by giving a certificate declaring the origin of the watches they sold. In reference to the proposed new distinctive marks for gold and silver Hall-marking of watch cases, he thought they would oppose any such change. The public now looked upon the Hall-mark of the lion as a standard, and it should be maintained. What was necessary, however, was that in the instance of Swiss or other goods they should educate the public into understanding what a Swiss or other Hall-mark meant. Questions were then replied to. The Chairman said, in course of his answers, that although a retailer need not necessarily describe a watch as other than a "Swiss horizontal" or a "Swiss lever," yet it would be advisable to add the words "of Swiss manufacture" for the purpose of safety. For instance, if Mr. Benson sold a watch marked as "Benson, London," the public were supposed to be buying a watch made by Mr. Benson—not one made in Switzerland or Clerkenwell. The true origin of a watch must be declared so as to prevent fraudulent representation, or fraudulent description.

Serious Charge against a Birmingham Jeweller.—At the Birmingham Quarter Sessions, Friday, October 21, 1887, George Griffin, jeweller, of Hunter's Lane, Birmingham, was indicted for receiving 2 ozs. of gold scrap, the property of Messrs. G. E. Walton, Limited, from James Ravenscroft, well knowing it to have been stolen. Mr. Stubbins (instructed by Messrs. J. C. Fowke & Son) prosecuted, and Mr. Hugo Young (instructed by Mr. Benbow Hebbert) defended. A second count charged him with stealing the gold, but this was not gone into. James Ravenscroft said that up to July 20 last he was in the employment of the prosecutors. The prisoner had previously been in the same employment, but left it about three years ago. On July 13 last he met the prisoner in Hamstead Road, and prisoner asked him if he could get him any stuff. Witness said he would try, and an arrangement was made that they should meet on July 27 in Icknield Street, Hockley. They met on that day, and witness gave prisoner about 2 ozs. of gold scrap which he had stolen from his employers. Another meeting was arranged for August 4 for the same purpose, and for prisoner to pay witness for what he had already given him. On July 28, however, Mr. Walton made a charge against witness, who confessed to it and made a statement to Mr. Walton in the presence of Detective-Sergeant Baker. On August 4, as arranged, witness went to Icknield Street about 8 o'clock in the evening and met prisoner, who asked him what was the matter at the shop, and why witness had been discharged; was it for theft? Witness said it was. Witness lived in a house at Priory Road, Handsworth, with his mother: the house belonged to Mr. Walton. On Saturday, October 15, prisoner came to the house, and in the presence of witness's mother he asked witness what he had done for him, what had he said. Had he made any admission as to what had passed between them?

Witness said he had, and prisoner remarked, "Well then I'm —— well done for." Witness was subjected to a rigid cross-examination by Mr. Young. He said he commenced to steal gold about a fortnight before July 27. He had never stolen gold before, and then he only stole a few pennyweights. A policeman was sent for, when he was charged with the theft and told that if he said what he had done with the gold he would not be prosecuted. Re-examined: Witness said the first thefts of a few pennyweights of gold followed upon his first meeting with the prisoner. Prisoner gave him 5s. for that amount. Mr. Foxall, manager to Messrs. Walton, said he made up his gold account on July 11, and next on July 27. On the latter date he should have had 13 ozs. 1 dwt., and he had a deficiency of 6 ozs. 13 dwts. By Mr. Young: We have heard that Ravenscroft only stole 2 ozs. and a few pennyweights.—Can you tell us what became of the other 4 ozs.?—I cannot.—Mr. Frederick Walton said prisoner was in his employment up till about three years ago, and Ravenscroft worked under him. Witness further deposed to Ravenscroft being charged by him with theft and to his confessing. Detective-Sergeant Baker deposed to hearing the Ravenscrofts' statement and to arresting prisoner and charging him with the offence of receiving. He denied the charge. Police-Constable Thomas said on the evening of August 4 he went to Icknield Street by instructions, and saw the prisoner loitering about as if waiting for someone; soon after Ravenscroft came along and joined him, and they talked together for some time. Louisa Ravenscroft, mother of the first witness, said on the 15th inst. prisoner came to her house in Priory Road, Handsworth, and saw her son. He asked her son, "Jimmy, what have you been saying about me; have you told them that you brought me any stuff?" Witness's son replied, "I have," and prisoner remarked, "I'm —— well done for." Witness was waited upon by Detective-Sergeant Baker on the same day, before her son returned from the Police Court, and she then dictated to Baker an account of prisoner's interview with her son that morning, and which she signed.—This concluded the case for the prosecution. The prisoner was found guilty, and the Recorder sentenced him to five years' penal servitude.

## Workshop Memoranda.

Phosphate of Soda.—This salt, easily to be had in commerce, similar to borax, in a melted condition takes up metallic oxides, consequently it acts like borax. Since it is a very thin fluid in heat, it is especially useful in cases when soldering with very hard solder are necessary. The crystallised commercial phosphate of soda also contains water of crystallisation, and this has a disturbing influence when soldering; consequently the crystals are exposed to the air, when they will lose their water, by becoming air slaked, and fall into a delicate white powder, which is immediately used for soldering.

Tarnish on Electro-plate Goods.—This tarnish can be removed by dipping the article from one to fifteen minutes—that is until the tarnish shall have been removed—in a pickle of the following composition:—Rain water two gallons, and potassium cyanuret one-half pound; dissolve together, and fill into a stone jug or jar and close tightly. The article, after having been immersed, must be taken out and thoroughly rinsed in several waters, then dried with fine clean sawdust. Tarnished jewellery can speedily be restored by this process; but be careful to thoroughly remove the alkali, otherwise it will corrode the goods.

"Mystery Gold."—An alloy of this kind entered the market many years ago, in the form of watch chains and other articles of jewellery, the composition of which was, copper sixteen parts, platinum seven parts, and zinc one part. This alloy, when carefully prepared, bears a close resemblance to 16-carat gold, and when electro-gilt would readily pass for the genuine article. The manufacture of this variety of spurious gold seems to have received a check for a certain period; but somewhat recently, in a modified formula, it has reappeared, not only in the form of articles of jewellery, but actually as current coin, and from its highly deceptive character, being able to resist the usual test, it has acquired the name of "Mystery Gold." It appears that, when converted into jewellery, the chief aim of the "manufacturers" is to defraud pawnbrokers, to whom the articles are offered in pledge; and, since they readily withstand the nitric acid tests, the "transactions" are often successful. According to Mr. W. F. Love, in a communication to the *Chemical News*, a bracelet made from an alloy of this character had been sold to a gentleman in Liverpool, and when the gilding was removed the alloy presented the colour of 9-carat gold. The *qualitative* analysis proved it to be composed of platinum, copper, and a little silver. A *quantitative* analysis yielded the following result:—

| | |
|---|---|
| Silver ... ... ... ... ... ... | 2·48 |
| Platinum ... ... ... ... ... | 32·02 |
| Copper (by difference) ... ... ... | 65·50 |

It was found that strong boiling nitric acid had apparently no effect upon it, even when kept in the acid for some time.

To Clean and Renew old Files.—Collect all the old files that are clogged up with grease and dirt and boil them for half an hour in saleratus water (4 ozs. saleratus to 1 quart water). Then wash them in clean water and place them in a solution of sulphuric acid and water (4 ozs. of sulphuric acid to 1 quart water). Remove the smaller and finer files at the end of about 45 minutes: the larger and coarser may remain in the solution from two to three hours; they should be examined from time to time, however, to see that they do not cut too much. Afterwards wash thoroughly with a stiff brush and plenty of clean water, and dry and oil them to prevent rusting. It will be found that many files which were apparently useless, will, after having undergone this process, cut almost as well and last almost as long as new ones.

Setting Jewel Holes.—The following directions are given by Saunier:—Whether it be a plate, cock or bouchon in which the stone is to be set, the piece must always be cemented to a chuck and the whole accurately centred. Turn it out to a depth corresponding to the thickness of stone, and make a circular groove round the hole thus made with a round-pointed graver, only leaving a very thin fillet of metal on the inside. The stone should fit easily in the hole, but without play, and should pass in to such a depth that its surface is slightly below that of the plate, &c., when there is an endstone; in others it must of course often depend on the endshake to be obtained. At the same time it appears desirable that it should always be slightly below. Clean out the setting and place a small quantity of oil in it to prevent the stone from flying out when made to rotate; or it may be rendered still more safe by a pointed pegwood stick held in the hand. The stone is fixed in position with a small conical burnisher (as, for example, the point of a round broach) very carefully polished so as to avoid all abrading action; if an excess of metal is forced over the surface of the stone it is removed with a graver. The surface of the brass is finally smoothed with a hemp stem or pegwood and tripoli in oil, followed with polishing rouge in spirits of wine. English jewel-setters often do not turn the groove, but leave a projecting edge round the hole which is pressed on to the stone with a burnisher.

## Gazette.

### Partnerships Dissolved.

Satchwell Brothers, Birmingham, manufacturers of jewellers' requisites. P. Lawson & Nephew, Hatton Garden, City, diamond merchants. Julius Cohen & Co., Hatton Garden, diamond merchants. John Watson & Son, Bradford, watchmakers.

### The Bankruptcy Act, 1883.

#### Receiving Orders.

*To surrender in London.*—Robert James Griffiths, St. Martin's Lane, Westminster, jeweller. William Jardine (trading as Jardine & Co.), Great Winchester Street, City, diamond merchant.

*To surrender in the Country.*—Henry James Hayhurst, Hastings, jeweller. James Henry Hunt, Birmingham, electro-plate manufacturer. Charles Madrell Caine and George Oscar Caine (trading as Caine Brothers), Liverpool, pawnbrokers. Thomas Arthur Temlin, Sheffield, watchmaker. Frederick Birchall, Liverpool, jeweller. Richard Barnaby Baines, Preston and Liverpool, pawnbroker. Richard Barnaby Baines and James Baines (trading as R. B. & J. Baines), Liverpool,

pawnbrokers. Frederick Francis Peasley, Wolverhampton, pawnbroker's manager.

PUBLIC EXAMINATIONS.

*In London.*—M. Sugar, Waltham Buildings, Holborn Circus, fancy goods dealer: November 8, at 12.30.

*In the Country.*—H. J. Hayhurst, Hastings, jeweller: November 7, at 1. J. H. Hunt, Birmingham, electro-plate manufacturer: November 15, at 2.

ADJUDICATIONS.

*In London.*—R. J. Griffiths, St. Martin's Lane, jeweller. M. Sugar, Holborn Circus, fancy goods dealer.

*In the Country.*—H. J. Hayhurst, Hastings, jeweller. T. C. Judge, Chard, clockmaker. G. H. Simmons, Builth, jeweller. T. A. Temlin, Sheffield, watchmaker. F. Birchall, Liverpool, jeweller. C. M. Caine and G. O. Caine (trading as Caine Brothers and as J. Edwards & Co.), Liverpool, pawnbrokers. R. B. Baines, Preston and Liverpool, pawnbroker. R. B. and J. Baines, Liverpool, pawnbrokers. F. F. Peasley, Wolverhampton, pawnbroker's manager.

NOTICES OF DIVIDENDS.

*In London.*—A. Jack, Cheltenham, jeweller: 8s. 6d., first: any Wednesday, Seear, Hasluck & Co., 23, Holborn Viaduct. J. Dubois (separate estate), Camden Road and Hatton Garden, watch manufacturer: 20s., first and final: any Wednesday, Seear, Hasluck & Co., 23, Holborn Viaduct. S. Thomas, Albemarle Street, Piccadilly, jeweller: 2s. 6d., first: any day, except Saturday, Chief Official Receiver, 33, Carey Street.

*In the Country.*—J. Joseph and M. Joseph (trading as J. Joseph & Sons and as Scott & Co.), Birmingham and elsewhere, jewellers: 5s., payable by three promissory notes at six, twelve and eighteen months: 120, Colmore Row, Birmingham. F. H. Tritschler, Carlisle, jeweller: 3s. 7d., first and final: on an after October 26, Official Receiver, Carlisle.

SCOTCH SEQUESTRATION.

O. Faller (trading as Faller Brothers), Inverness, watchmaker.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

12,711. James McClelland, Birmingham, for "An improved stand for clocks and other articles." Dated September 20, 1887.

12,799. T. Baxter, London, for "A balance-spring-collet shifter for the use of watchmakers." Dated September 21, 1887.

12,898. F. J. Britten, London, for "Winding work for marine chronometers." Dated September 23, 1887.

12,955. H. E. Webb, London, for "An improved key for winding watches and for opening watch cases." Dated September 24, 1887.

13,091. Mariano Viau, London, for "Electric motor for clocks." (Complete specification.) Dated September 27, 1887.

13,132. J. J. Rowley, Lewisham, for "An improved combined shirt and collar stud or fastener and necktie retainer." Dated September 28, 1887.

13,330. W. Falk, London, for "An improved keyless watch." Dated October 1, 1887.

13,373. H. D. Cole, London, for "An improvement in or in connection with clocks and other timepieces." Dated October 3, 1887.

13,522. C. A. Burghardt and W. J. Twining, Manchester, for "Improvements in the production of aluminium." Dated October 6, 1887.

13,663. E. Golay, London, for "An improved manufacture of compensating balance wheels for watches and clocks." Dated October 8, 1887.

14,037. E. H. Durban and W. N. Last, Birmingham, for "Improvements in the method of mounting or setting certain or various designs or articles of jewellery or coins in brooches, breast pins, solitaires and other similar articles." Dated October 17, 1887.

14,054. D. G. FitzGerald, London, for "An improved electro-chemical process for the extraction of the precious metals from their ores." Dated October 17, 1887.

14,128. M. Weber, Liverpool, for "Improvements in studs for collars, cuffs and other like purposes." Dated October 18, 1887.

14,174. J. S. MacArthur, R. W. Forrest and W. Forrest, London, for "Improvements in obtaining gold and silver from ores and other compounds." Dated October 19, 1887.

14,221. A. B. Cunningham, London, for "Improvements in the reduction of lead, silver and other metals, and apparatus therefor." Dated October 19, 1887.

14,252. J. A. Lund, London, for "Improvements in self-winding clocks or clockwork." Dated October 20, 1887.

## Recent American Patents.

| | |
|---|---|
| Brazing Machine. N. H. Roberts | 369,077 |
| Button, Cuff. W. E. Gillman | 369,106 |
| Celluloid, Die for Moulding Hollow Articles of. J. A. Furman | 369,784 |
| Chain, Watch. H. Fritsche | 369,053 |
| Clock, Calendar. E. W. Morton | 368,961 |
| Clock Case Mould. C. Hellebush | 369,337 |
| Clock, Electric Alarm. A. J. Wooley | 369,672 |
| Clock for Timing Watches, Striking. J. F. Beyerle | 370,038 |
| Clock-striking Mechanism. J. L. Sullivan | 370,219 |
| Clock, Universal. S. S. Moyer | 369,462 |
| Clocks, Electric Synchronising Attachment for. E. F. Bard | 369,386 |
| Cuff Holder. C. E. Cander | 369,160 |
| Cutting and Burnishing Tool. J. P. Lewis | 369,252 |
| Drilling Machine, Portable. J. Moffet | 369,120 |
| Eyeglass or Spectacle Frame. J. J. Minster | 369,544 |
| File-cutting Machines, Chisel Holder for. J. Buyer | 369,690 |
| Gold and Silver Refining. Johnson & Ryan | 370,338 |
| Grinding and Polishing the Interior of Hollow Ware, Machine for. J. T. Duff | 369,326 |
| Jewellery, Manufacture of Shell. C. Moegling | 369,649 |
| Metals, Electric Welding and Tempering. E. E. Ries | 370,282 |
| Metals from their Ores, Separating. D. W. Birmingham | 370,366 |
| Metals, Machine for Drawing. H. R. Kennedy | 369,290 |
| Micrometer Gauge. J. Moffitt | 369,357 |
| Music Box Comb. Paillard & Recordon-Sulliger | 369,258 |
| Pendulum Power. D. Gerstein | 369,176 |
| Polishing Lap. G. E. Brown | 369,431 |
| Rock Drill, Diamond. W. Odgers | 369,654 |
| Screw Threads, Die for Rolling. C. D. Rogers | 370,354 |
| Watch. A. Junghans | 370,146 |
| Watch Balances, Machines for Turning and Polishing Rims of. E. A. Marsh | 369,836 |
| Watch Case. C. F. Morrill | 369,871 |
| Watch Regulator. J. W. Hurd | 369,095 |
| Watch Springs, Apparatus for Tempering. F. Sedgwick | 369,590 |
| Watchmaker's Tweezers. L. Hirsch | 369,182 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

The

# Watchmaker, Jeweller and Silversmith.

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## SPECIAL NOTICE.

**Our correspondents are kindly requested to note that the Office of this Journal has been removed to more commodious premises at No. 7, St. Paul's Churchyard.**

CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

WHATEVER may be the result of the Merchandise Marks Act on the future of the English watch trade, upon which so much divergence of opinion is expressed, there can be no doubt that it is having the immediate effect of greatly stimulating manufacturing enterprise in many directions. This is evidenced by the activity reported from various centres, the formation of companies, &c. Although it seems to have become the fashion to depreciate ourselves, our methods and our resources, a better and more intimate acquaintance with what is here being done and what can be done, is, we are convinced, only what is wanted to create a different and more favourable impression. Of course, while so much difference of opinion exists among leading manufacturers as to the respective merits of old and new methods of production, there can be no hope of the definitive adoption by the whole trade of a particular system. But, while there are such unanswerable arguments in favour of both, we cannot see what is to prevent their being successfully worked concurrently. Various causes have been assigned for the alleged decadence of the English trade, but, whatever else may have affected the home industry, there can be no doubt that increased foreign competition has had much to do with the existing depression. This was the result, first, of the introduction of the factory system into America and the necessity of watch factories there creating fresh markets for their large output; and, secondly, of the increased activity of the Swiss, who were some few years since awakened to their shortcomings by the report of Monsieur Favre-Perret on the American system of manufacture.

Let the English trade then, in like manner, learn first what are the bases of American and Continental procedure and then inquire into their own systems and resources, and there can be no fear as to the result.

The idea that is so prevalent among watchmakers of the old school that there is at present any practical limit to the demand for all classes of watches will not bear the most superficial

examination of statistics on the subject. At any rate this idea is not yet entertained by the largest Transatlantic producers, who are extending their operations in every direction.

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As we took notice of, in our last issue, a scheme for the establishment (on a larger scale than has yet been attempted) of an English watch factory, is on the carpet, and from the progress that has already been made, there is every reason to suppose that the undertaking will shortly become *un fait accompli*, at all events, as far as the formation of a company and the establishment of a factory are concerned. But the practical working of such a concern presents many points that should be exhaustively considered, both by the promoters and those who contemplate embarking capital in the enterprise, before a final decision as to the *modus operandi* is arrived at.

Foremost among these considerations come, of course, questions as to the class of goods that are most in demand, with other economical particulars involved in the detailed arrangements of the manufacture.

It is not our intention to go into these matters just now, as, whatever arrangements may be come to at first, even after the most careful statistical studies and consultations with experts, will most likely require considerable modification before the factory has been long in practical operation.

What we would point out, however, is the necessity, in order to successfully carry out such a project, for starting the working of the factory on the right lines.

These would comprise uniformity of gauging on a scientific basis, and the adoption of a recognised standard for the pitches and diameters of screws, such as is in use among Continental manufacturers.

In August, 1883, a sub-committee of the British Association, appointed to consider the latter subject, pointed out the desirability of securing a system of small screws international in its character, and recommended that a thread of a certain form be adopted. They concluded the report by saying they would only advocate the definitive adoption of certain modifications, previously recommended by them, after consultation with the Swiss Committee appointed to consider the same subject, as they considered the absolute identity of English and Continental screws to be of primary importance.

Since the issue of the above-mentioned report we are not aware of any steps having been taken by English watchmakers in the direction indicated. As the want of uniformity in our system of gauging is admittedly one of our primary weak points, is not the subject worthy of the attention of those who are now going in for the new departure?

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We learn from the Hydrographic Office of the Admiralty that the officer in charge of India Marine Survey has reported that the following additional time signal has been established at Madras:—The signal is a gun fired daily by electricity from a battery near the lighthouse, at noon, Madras mean time, equivalant to 18h. 39m. 00.6s., Greenwich mean time.

# General Notes.

Mr. Uhrig, who in the 1886 Chronometer Trial was first and second, has again gained premier honours at Greenwich, his two chronometers being this time first and twelfth respectively.

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On the 18th ult. the shop of Mr. Walker, Finchley High Road, was burglarised and some £40's worth of watches, rings and other jewellery carried off. The thieves, who effected their object by cutting a large hole through the plate-glass front and a revolving shutter, are believed to belong to the same gang that, on the previous Monday, stole from the residence, near Barnet, of the Dowager Countess of Caledon jewellery worth £800.

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The Winterthur (Switzerland) correspondent of *Industries* states that the value of exports of watches from the consular district of Chaux-de-Fonds to the United States for the third quarter of the current year amounted to £64,338, as compared with £59,055 in the same quarter of 1886. The value for the first nine months of this year was £172,229, as against £129,855 in the corresponding period of last year.

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The Anniversary Dinner to celebrate the eighth anniversary of the opening of the Horological Club is announced to take place in the club room at the Horological Institute on Friday, the 2nd inst. The musical arrangements will be in charge of Mr. F. W. Knight, who on similar former occasions has so successfully carried them out. Tickets, price 3s. 6d. each, may be obtained of any member of the committee, or of the Hon. Sec., Mr. Henry Bickley, 33, Half Moon Crescent, Barnsbury.

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At the close of the Exhibition of specimens of hand turning, held at the Mansion House, under the auspices of the Worshipful Company of Turners, on October 28th last, fourteen of Messrs. Ford & Wright's apprentices were awarded prizes for excellence in diamond cutting and polishing. All the specimens shown bore evidence of the high quality of the workmanship turned out by this now well-known firm, and it is gratifying to be able to note such tangible proof of the reality of the revival of an industry that not long since was quite lost to this country.

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A curious story is attached to the gift of the new mayoral chain to Hanley, which was described in our last month's issue. It seems that when the Stoke boroughs were incorporated, a Mr. Richards, one of the first members, presented the Hanley Corporation with a mayoral chain; but a short time ago it was found to have been made of base metal, on which discovery being made Mr. Keeling promised a new chain. It would be interesting to know how the worthy burgesses of Hanley found out that their chain was of base metal. Was the original donor imposed upon? or has the corporation been mistaken all along as to its intrinsic character?

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Professor Roberts-Austen, F.R.S., and Messrs. Courteney Boyle, C.B., and Henry J. Chaney, are the members of the committee appointed by the President of the Board of Trade to confer with the officials of the Assay Office of the United Kingdom with regard to the steps to be taken under the watch clauses of the Merchandise Marks Act. They have been attending meetings of the wardens of the various corporations at Edinburgh, Glasgow, Sheffield, Birmingham and Chester, in pursuance of their inquiries in the matter, and the trade will doubtless soon be relieved from the state of suspense in which it has been for so long by the publication of the Order in Council, based upon their recommendations.

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The fourth course of Cantor Lectures at the Society of Arts will be delivered on March 12, 19 and 26 by Professor W. Chandler Roberts-Austen, F.R.S., on "Alloys."

Manufacturers, traders and others interested in the operation of the Merchandise Marks Act should obviously make themselves familiar with its provisions. For this purpose we recommend the following pamphlets (in all of which it is fully embodied) to their notice:—"The Merchandise Marks Act, 1887," by Albert Gray, of the Inner Temple, price 3s. 6d., Wm. Clowes & Sons, 27, Fleet Street. "The Merchandise Marks Act, 1887," by Newnham Browne. "The Law of Trade Marks," by J. F. Bennett, 82, Queen Street, Cheapside, E.C.

The Annual Ballad Concert in aid of the funds of the Clerkenwell Benevolent Society is announced to take place on the 19th inst., at the Agricultural Hall, Islington. As the Committee announce in their annual report, the high-class character and consequent success of these concerts have become proverbial, the last one realising a net profit of nearly £150, which, after paying for the relief tickets and general expenses, left a balance of £51 17s. 11d. to be carried to the general fund for continuing the charitable operations during the ensuing winter. The useful work done by the Society last season was represented by the distribution, through its subscribers, of some 2,000 sacks of coal and the like number of quartern loaves to the deserving poor of the district, and the amount of comfort thus bestowed can only be partially realised even by those well accustomed to house to house visitation. The recent severe depression in the watchmaking and jewellery trades is likely to make the present winter peculiarly distressing to those who have been thrown out of employment in consequence. There can be no better way of finding out and realising deserving cases (which would probably be otherwise overlooked in the ordinary course of eleemosynary relief) than in the system of distribution adopted by the Society, and we trust the financial results of the forthcoming concert will be as favourable as its object is meritorious.

With reference to the *montre-observateur* brought out by the Parish watchmaker Schwob, which we noticed in our October issue, Monsieur A. Redier says, in the *Revue Chronometrique*:—In point of inventions proclaimed as new, without real novelty, we may cite the watch sold under the name of *montre-observateur*. A small dial of hours and minutes, placed between the IX. and the centre of the ordinary dial gives the time correspondingly with the two large hands; but, on pushing a bolt, the two little hands are returned to zero, from whence they go on again. If, for example, we return them to zero at the moment of taking a coach by the hour, when the time comes for paying the coachman it is only necessary to read the hour marked by the little hands in order to know, without calculation, the time passed. The method is not new. At the time when the *Societé des Petites Voitures* was founded, about 1854, many arrangements of this kind were constructed. We believe that the house of Oudin, of the Palais-Royal, originated the painting of an arrow-point upon the glass of the watch. This glass could be turned easily by the hand; and at the time of engaging a carriage the hour hand and the painted arrow were superposed. This was a simple reminder. A number of carriage counters which have, by the researches made, caused so much loss in horology, are based upon this idea. One or two hands were returned to zero at the moment of departure—the one indicated the time elapsed; the other the amount to pay. The writer has himself constructed such watches with, however, but one (hour) hand and the dial divided into six figures, so as to facilitate the reading. Monsieur Redier goes on ironically to say: "What a good opportunity for the new constructor; the idea is excellent, useful and serious. The means employed may be simplified; that which the undersigned used long ago, and which he put at the disposal of the first who demanded it of him, may be applied to all watches." "But it is not even with ideas of this kind that one will relieve the state of an industry which is truly in consumption."

The Barcelona Exhibition—The Barcelona Exhibition will be opened on April 8 next. Intending exhibitors will be required to enter their names before the close of the current year.

It is stated that the guarantors of the Liverpool International Exhibition of 1886 are to be called upon to pay nearly 22 per cent. of the amount of their guarantee towards the liquidation of about £20,000, as shown in the accounts issued by the auditors.

Edinburgh Exhibition.—At a meeting of the Edinburgh International Exhibition Association, held on November 11, it was announced that the total receipts of the Exhibition amounted to £110,525, and the total expenditure to £104,830, leaving a surplus of £5,695. Some time ago it was expected that the surplus would reach £15,000 or £16,000, but that idea has proved too sanguine. The question of how the money left over is to be disposed of will be submitted to council for an opinion.

Paris Exhibition of 1889.—M. Berger, on behalf of the General Committee, has issued a circular warning intending exhibitors that certain unauthorised persons are calling on manufacturers, offering for a fee to obtain for them specially favourable space at the Paris Exhibition of 1889. These self-styled "agents" have, it seems, been at work among the foreign exhibitors. The Ministers of Commerce and Public Works have asked the railway companies to concede 50 per cent. of their rates for the carriage of raw materials to the great Exhibition of 1889. This concession was made to the exhibitors of 1878.

A case of mistaken identity, which might have had very unpleasant consequences to at least one of the parties concerned, occurred last month at the Westminster Police Court, in which Mr. W. F. Steel, a watchmaker and jeweller of repute, and member of the District Board of Works, was charged by a woman with detaining a silver belt valued at £5, which she stated she had left at his shop for repairs, and in which she was corroborated by two witnesses. Luckily for Mr. Steel, Mr. Brenchley, watchmaker, of Churton Street, Pimlico, came to the rescue at the right moment, and producing the belt, stated that it had been left with him. Most people will concur in the magisterial censure on the complainant and in the justice of her being mulcted in the five guineas costs which she was ordered to pay. But such cases afford food for serious reflections on the equivocal position in which men may be at times placed, and on the value of evidence generally.

The Diamond Market.—The continued demand for finished stones has slowly but steadily increased, which has enabled sellers to hold out for somewhat better prices than were before obtainable. Serious fears are entertained, however, among the Continental workers that the amalgamations now going on among the South African Mining Companies will soon affect the market to the disadvantage of buyers. As it is, *rough* still continues dear. *De Diamant* advises smaller manufacturers to hurry on with their goods, even if it involves paying more to workmen, in view of the generally increased demand towards the end of the year.

*Paris* workers have been busy all round, including the setters; and many parcels have changed hands, mostly for the United States account. High-class goods are readily saleable, and a good demand exists for *roses*.

The steamers "Mexican," "Garth Castle," "Spartan," "Roslin Castle" and "Tartar" arrived at Plymouth during the month, bringing large parcels at somewhat higher prices from the fields, but, as large numbers of Foreign buyers are in the London market at present, competition is pretty brisk and not much remains unappropriated. "Cleavages," "Givreux" and "Yellows" are much sought after, and most of the last that was on hand has been disposed of.

Latest from *Kimberley* report that the market has hardened and quotations are very firm.

Silver.—There has been little business done in the market throughout the past month, and although quotations have been characterised by the usual slight fluctuations in sympathy with the Indian Exchanges, 43⅞d. and 43d. per oz. for bars and dollars respectively have been the ruling prices.

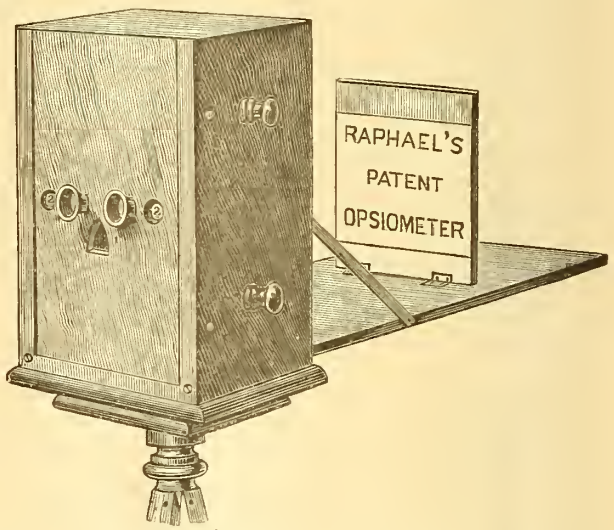
## Trade Notes.

MAYORAL CHAIN FOR HAVERFORDWEST.—Following the examble of Pembroke, the town of Haverfordwest is now having an elaborate mayoral chain, which in style and treatment will hold its own with the finest civic chains in Wales. It is privately presented in honour of the Jubilee Year of the Queen, and has been manufactured by Messrs. T. & J. Bragg, of Birmingham. The central object of the badge, the cognisance of the town, belonging to the "castle" period of British heraldry, shows a quaint castle with three towers, oriels and closed doors, the warder with trumpet on the central watchtower and banners flying on the others. The supporters are a dragon and an eagle, while on the green sward in front of the castle is crouching the wyvern or red dragon of Wales. This is rendered in enamel in the true mediæval spirit, and the name of the borough is given in the circular border. Four circular escutcheons are arranged round the centre device, all richly enamelled. The upper one represents the Royal emblem, the Tudor rose; the lower one the crest of Wales; those at the sides record the various charters from Edward II. to James I., a subject which is further illustrated on the chain itself by the enamelled arms of the respective sovereigns. Between the four circles come the civic mace and the fasces, placed crosswise and interspersed with oak and laurel. Above the badge is a smaller pendant, appropriately decorated, containing an enamel painted miniature of the Queen, executed on a plaque of gold 18-carat quality. The centre link of the chain itself consists of the Royal arms, garter, crest, supporters and motto, all carried out in best style and in correct colours, forming a most effective starting-point for the main body of the chain.

MAYORAL CHAIN FOR PENRHYN.—Mr. John Bisson, the Jubilee Mayor of this ancient Cornish borough, has by gift and subscription secured a handsome gold chain of office for its chief magistrate, in commemoration of the fiftieth year of Her Majesty's reign. The order was given to Messrs. T. & J. Bragg, of Birmingham, who have now completed the work in a way that will add even to their well-earned reputation. The chain is of gold, Hall-marked on every link, the larger links having civic crowns surmounting Crusader shields, some portion of which are already engraved with the names and years of office of past mayors as subscribers to the chain—the others being left for future occupants of the chair. The centre link is a Jubilee trophy, shown by a pretty device in enamel and including the name of the present mayor. The badge, which depends from the centre link, takes a general circular form—the ancient shield of the town—a saracen's head with band—the shoulders, covered with antique armour, being finely treated in enamel; the shield gold, on a crimson diaper, leads to the old inscription, "Burgus Penryn," as in the borough seal, given here in gold letters on a blue enamel field; a bold wrought, open wreath of oak one side and laurel the other completes the circle. But the interest of the badge is much enhanced by a *facsimile* in miniature of a superb loving cup, presented in 1613 by Lady Jane Killygren, and also in saltire, reduced copies of the two fine old maces in the possession of the corporation. The arms of Mr. Bassett, a large contributor, are placed on reverse of badge, and the effect of the whole is quaint and original.

PHOTO FRAMES have come into general use in the decoration of the home and as a receptacle for the photographs of those we are desirous of retaining in our memory. Of the many that have come under our observation, one of the most excellent is the new registered "Renaissance" frame manufactured by Messrs. King & Sons, of 222, Goswell Road, E.C. This unique work in the Renaissance style of art, a beautiful pierced *repoussé* scroll, is made in all sizes (carte-de-visite, boudoir, imperial, panel, &c.), and being plated and lacquered, will not tarnish. The samples of mirrors just finished are most handsome, particularly some mounted on plush velvet. The firm report a large sale of these goods. Another frame, manufactured by the same firm, is a pierced flower and leaf pattern of very tasty design, for which the prices quoted seem very low. Among their various patterns of antique and early English silver and silver-plated frames may be mentioned a neat-bordered one with cherubs, surrounded by a small scroll, and another of a bolder and broader design, with figures introduced in the corners and centre and pierced work surrounding. It is curious how from simple designs an effective result is produced which always pleases: and this is probably why the early English designs, not only of jewellery but of all decorations and adornments, have again taken such a hold on public favour. Messrs. King & Sons make a speciality of this style in buckles, clasps and chatelaines, &c., while the pincushions, matchstands, &c., manufactured by them in pierced *repoussé* work are very pretty and useful adjuncts to the mantlepiece and toilet table.

THE accompanying illustration shows the new "opsiometer" of Messrs. J. Raphael & Co., of 13, Oxford Street, W., which was fully described in our last issue.




THE New Edition of Kelly's "Directory of the Watch and Clock Trades" is now ready and will be sent from this office, as advertised on another page. It is the most complete directory of the watch, clock, jewellery and kindred trades yet published, and should prove of great service to those to whom such a guide is a desideratum.

THE ALBERT MEMORIAL IN GOLD.—A model of the Albert Memorial in gold is amongst the Jubilee presents to Her Majesty, being presented by His Highness Abu Bakar, Sultan of Johore, who was very recently in England, when he was raised by treaty to the dignity of Sultan. It stands unique in the collection of gifts now on view. The Sultan entrusted Mr. Benson, of Old Bond Street, with its production in the early part of the year. The model is faithfully carried out in every architectural detail to scale from the plans of the late Sir George Gilbert Scott. It stands 21 inches high, and is made entirely of fine gold, as are the railings and four corner groups of Europe, Asia, Africa, and America, the steps being frosted silver. The model is enriched by the use of enamel to express the onyx and gem-like stones of the tabernacle work in the original. The mosaic pictures in the gables are delicately painted enamels by special artists. The canopy over the statue of the Prince is likewise enamelled. The podium or pedestal is a striking part of the model, as the numerous figures of the frieze—poets, painters, architects, and sculptors—are reproduced. The groups at the angles representing the industrial arts of the country, as well as those of the four quarters of the globe, have all the details of the originals. Against the pillars are the tiny statues of allegorical figures representing the greater sciences and Christian virtues, and again, above these the angels beautifying the spire.

Visiting the watch factory of Messrs. P. & A. Guye, 77, Farringdon Road, E.C., last month, we were agreeably surprised at the extent of the preparations there made for complying with the watchmaking clauses of the Merchandise Marks Act, and for generally extending the manufacture. Although the factory system has long been in operation with them (nearly a 100 operatives being employed), the firm have hitherto used their discretion in availing themselves of certain foreign materials and parts for economical and other reasons. But all this is now altered, and the new and improved plant will enable them to turn out in future the complete watch, from the movement to the case, on the most approved methods, besides doubling the number of hands employed. Mr. A. Guye informed us that they are now bringing out a cheap watch of a new calibre which, by increasing the output, will still further enable them to economise in the different processes. As all the parts of their watches are strictly interchangeable, and as there is plenty of skilled labour obtainable for finishing and adjusting processes, there can be but little doubt that the future productions of the firm will maintain their past high reputation, and enable them to successfully compete with other organisations, to the obvious advantage of the London watch trade.

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Of the numberless contrivances that have from time to time been invented for the purpose of obviating the broken finger nails and crumbled linen consequent on the use of the ordinary form of cuff buttons and sleeve links, and perhaps of promoting the morality of the wearers, most have been open to objections on account of liability to get out of order, or loss, from the parts being detachable. The sleeve-link shown in the annexed cuts,

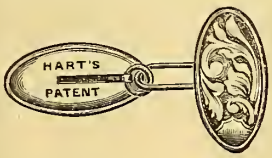

Fig. 1.

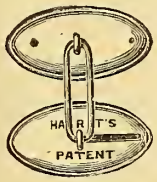

Fig. 2.

however, is entirely free from these drawbacks, and being exceedingly simple and easily adjusted, is doubtless destined to become generally adopted. The clearness of the illustrations render a description almost unnecessary. To fix the link in the cuff the moveable ring is slid to the outer end of the slot, as shown in fig. 1, and the end A is inserted through the two holes of the cuff from the outside, and when through the top is slid into the position for holding as shown in fig. 2, where it is securely held by a pressure spring. It is the invention of Mr. Thomas Hart, of 4, Heathcote Street, W.C., and its manufacturers are Messrs. Appleby & Co., of 55, Frederick Street, Birmingham.

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Birmingham Silver.—The following is circulated by the Birmingham Assay Office :—It having come to the knowledge of the Guardians of the Standard of Wrought Plate in Birmingham that silver lower than the standard recognised by law is being used in the manufacture of silver plate, and that such silver plate is being manufactured and exported without having been assayed and marked, notice is hereby given as follows :—It is contrary to law to use in the manufacture of silver wares (other than those expressly exempted from the operation of the Assay Office laws) any silver of a lower standard than that prescribed by law—viz., 11 oz. 2 dwts. of fine silver to every pound weight troy. All silver wares (except as aforesaid) must, before they are sold, exchanged or exposed for sale, be duly assayed or marked. All persons offending against these regulations are liable to be proceeded against according to law. And notice is hereby further given that a reward of £25 will be paid by the said Guardians to any person who shall give information to them as will lead to the conviction of any manufacturer or dealer offending as aforesaid.—Thos. Martineau, Law Clerk to the Birmingham Assay Office, Birmingham, October 6, 1887.

## The Diamond Cutting Industry.

In an interesting article (of which the following is an abstract) the *Statist* calls attention to this industry, with the expressed object of awakening Englishmen to its importance and the expediency of re-establishing it in this country.

The paragraphs referring to the possible earnings of the workpeople employed are particularly deserving of attention. We notice, however, that the writer of the article makes no mention of what has already been done here in this direction, and should very much like to hear something from Mr. John Jones, Sir Henry Bessemer, or Messrs. Ford & Wright (the last of whom could without doubt afford some valuable, practical and statistical information) on the subject.

Following an introductory part, the writer states that it has been from official sources ascertained that the rough stones exported from the Cape during the four years 1883-6 weighed no less than ten-and-a-quarter millions of carats, valued at eleven-and-a-half millions sterling, but no reliable data can be obtained prior to September, 1882. Of course no accurate estimate can be made of diamonds taken away on the person or stolen or smuggled away. Further, it is estimated that 33 millions of carats, realising upwards of 40 millions sterling, had been extracted from the mines of Kimberley, De Beer, Bultfontein and Dutoitspan collectively up to the end of 1886.

The diamond cutting industry in Amsterdam, which employs in all some 10,000 persons, appears to have been in a state of transition for some years past, and it is a fact that much of the capital employed in this lucrative enterprise is controlled by London and Paris houses. The original system, by which the owners of the so-called diamond cutting mills in Holland simply provided the motive power, lighting and necessary space at fixed rates to contracting cutters, seems to be gradually giving way to the establishment of large diamond cutting works employing regular cutters, who are paid wages according to their capability. The number of mills in existence in the Dutch capital cannot be less than 6,000 to 8,000. Not only is this number rapidly increasing, but the cutting industry has extended from Amsterdam to Antwerp, to Hanau, near Frankfort—where the diamond cutting and polishing is almost exclusively for London account—and even to Switzerland.

It would be difficult—in fact impossible—to give anything approaching to correct statistics of the quantity of diamonds passing through the Amsterdam mills, owing to the special character of the trade and the fact that the stones, both rough and cut, are carried backwards and forwards between Amsterdam and the markets on the persons of the dealers—thus escaping observation of the State authorities—and also from the number of private cutters engaged in the business; the best judges, however, estimate that about 20,000 carats of rough diamonds are weekly manipulated by the Amsterdam craftsmen.

As regards wages it is not easy to give any absolute figures which would serve as a basis, nearly all the work being done by the "piece," the price of which varies with its nature and the size and value of the stones; hence the tariff has a very wide range. A skilled cleaver and polisher can almost command his own price. In the large establishments which employ cutters the wages paid are about as follows:—Women and girls for rose cutting, 25s. to 35s. per week; cutters, 35s. to 75s. per week; cleavers, 50s. to 130s. per week; polishers, 40s. to 120s. per week, working twelve hours daily.

There is no doubt that some of the skilled and private workmen can and do earn more than the maximum figures. These workmen under the old system have to pay for space and motive power about 2s. to 2s. 6d. per day of twelve hours—the weekly rental of about 15s. per mill, showing a profit of about 50 per cent. after deduction of expenses and interest on capital.

The earnings of workmen employed in the Amsterdam trade are gradually decreasing, and probably will continue to do so, as the new system of large works conducted on wages payments, and with powerful mechanical appliances, develops. Hence, even if skilled English workmanship were not immediately pro-

curable here, there would be little, if any, difficulty in inducing Amsterdam diamond workers to come to London at about the same rate of wages as hitherto paid them in Holland. The poorer Jews, who are so largely engaged in this industry, are nomadic, fond of change, and soon make themselves at home in their new surroundings; moreover, the surplus labour will, ere long, make itself felt in the Dutch capital.

After giving these particulars the writer in the *Statist* adds that there is no presumption in stating that this art would be capable of employing thousands of artisans, both male and female, and distributing in wages an amount which would reach annually at least half-a-million sterling. There are in our midst skilful and competent Englishmen, able and willing, if only properly backed up and encouraged, to implant anew in this country, and to direct with intelligence and entire success, this most lucrative business. There can be no question of our ability to erect and equip workshops equal, if not superior, to anything to be found in Holland or elsewhere, and to carry on operations at a reduced cost. The trade admits that factories solely laid out for cutting, and capable of turning out workmanship of the highest excellence, would receive hearty support, and that if such were efficiently organised they would undoubtedly be successful. Under these circumstances it certainly appears desirable that the trade should foster any movement which may have for its object the restoring of the lost art to its ancient stronghold, and of making world-wide the fact that British workmanship is equal to-day to any that can be procured abroad. The time has arrived for action, the field of operations is open, and the demand is greater than the supply.

## The Pawnbrokers and the Merchandise Marks Act.

AT the meeting of the Metropolitan Pawnbrokers' Protection Society held on Wednesday, October 26, the solicitor submitted the opinion of counsel upon the provisions of the Merchandise Marks Act. They were read at length and set forth a statement of the very difficult position in which it would place the pawnbroker.

Mr. Telfer observed that this was a result of the mischievous opinion existing as to the idea of making people virtuous by Act of Parliament—of compelling them to be honest from outside instead of in. It was an example of the danger of the Legislature interfering at the instigation of persons who knew nothing of the intricacies of business—a course calculated to make more misfortunes than it would cure. His own idea was that the matter should be submitted to the Liberty and Property Defence League. It would be necessary that something should be done to mitigate the severity of the Act, which placed restrictions upon innocent as well as upon dishonest men. If a copy of that report and opinion came into the possession of the Liberty and Property Defence League, some good might result in getting rid of the more unbearable restrictions of this Act.

Mr. H. A. Attenborough said that no watch had been made in England for the last 40 years which had not some part of it of foreign manufacture.

Mr. James Russell said the Act was not likely to touch the pawnbrokers at present, and they had best wait and see how it affected others.

Mr. Telfer moved that a copy of this document be sent to the Liberty and Property Defence League.

It was finally, after some discussion, agreed that the matter be left in the hands of Mr. Telfer to deal with as he thought fit.

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The *Pawnbrokers' Gazette* says that this Act promises a mass of difficulty to the pawnbroker. He is bound by law to sell by public auction all his forfeited pledges for more than 10s. But how can he venture to do so with this Act hanging over him? The Metropolitan Protection Society have taken the opinion of counsel upon the bearing of the Merchandise Marks Act on their operations, and the result has been eminently discouraging. The position of the trade, in common indeed with all other occupations, is girt about by such a host of pains and penalties that they cannot see their way, and have therefore thought it wisest not to give publicity to the report. There is no use, they assume, in instructing those who may desire to make a profit—or to extort hush money—from members of the trade, who will in many cases be involved in serious difficulty by this Act. In all probability it will not be the pawnbrokers who will first feel the evils of the new system, and they will do well to wait and watch, so as to see how the new law works before its operation reaches them.

## Birmingham News.

From Our Correspondent.

THE Deeds of Arrangement Registration Act, 1887 (an account of which will be seen on another page) is generally accepted here as a useful and important move, the usual remark being, "A sensible bit of legislation at last."

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It is a pleasure in these degenerate times of cheap workmanship and inferior goods to find instances here and there of nice artistic work still being produced. I was fortunate enough last week to see a specimen of the silversmith's art in the shape of a very beautiful key, the handle being composed of an heraldic shield surrounded by a floral design of a very suitable conventional character, supported by a handsome column or shaft leading down to the wards of the key, which are so arranged as to form a monogram, the whole made of silver, richly gilt and enamelled. It is the production of Messrs. S. Blanckensee & Son, Frederick Street, Birmingham, upon whom it reflects great credit as a specimen of nineteenth century art work. I believe that this firm are competing very successfully for this class of work, several instances having come to my notice of their taking orders over the heads of other makers.

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The hopes that we should have a run of good business up till Christmas seem to have been suddenly nipped in the bud, and after some six weeks of brisk work and a considerable increase in the number of smiling faces and numerous expressions of "I really think trade has taken a turn for the better," the report again is that trade generally is flat; there are a few exceptions—some firms working early and late—and I think that they are all diamond mounters: perhaps the gossip about the "Diamond Corner" has something to do with this.

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There is a large amount of talk about that same "Diamond Corner;" the first question generally being "How much capital will it take to make a success of it?" Some of the mounters are hoping for it to "come off." Having heavy stocks, the prospect of a rise in the price seems very rosy: but I think, as far as the mounters are concerned, the opinion I heard given by the head of a firm in a large way of business in that branch is the most reasonable—he argues thus: "The great increase in our branch of the jewellery trade that we have experienced in the last few years is mainly owing to the fact that diamonds are cheap and have thus come within reach of another class of wearers than hitherto; raise the price of these stones to the old-fashioned scale and what will be the result? some of us who have large stocks may make a fair increase of profit upon the sale of them, but it will curtail the number of our orders for the future, and for my part I prefer the large turnover at popular prices." Well, I think that this is the right argument; but the gentlemen who propose forming the syndicate to buy up diamond stock and if possible to limit the out-put for the future, are not, I suppose, doing this for the benefit of the diamond mounters or jewellers, but in order to put a few thousand pounds into their own pockets, consequently they will be unable to see the logic of this way of reasoning. It is of course a matter of some considerable doubt whether they will be able to do it, as the diamond fields are rather more numerous than they were some years ago; however, the effect of the gossip on the subject is a tendency towards increased prices, and this will put money into some cash-boxes.

## Delhi Jewellers.

By William Simpson, R.I., F.R.G.S., Hon. Assoc. R.I.B.A.

THE jewellers of India are an important class. In no other country in the world is his work in such demand. This will be understood when it is remembered that men, women and children all wear personal ornaments, and that, too, to the fullest extent that the means of each individual will admit of. The poorest man, if he can procure a "firozeh," that is, a turquoise stone—however black and dirty it may be—from a belief in its being lucky and that it will save its wearer from accidents, has it mounted on a ring made of the smallest amount of silver. This is one kind of talisman; but charms of many kinds are carried on the person. With the Hindus the symbol of the particular deity a man worships is worn in a small case, often on the arm; with the Mohammedans the "faswir," or relic-holder, is suspended by a chain round the neck and contains some particular verse from the Koran. Almost all, young and old, wear articles of this kind; with the poor they are made of copper, but with the wealthy, silver and gold is the material, and the more costly are set with jewels. It should also be remembered that in India no banking system existed, and that savings were either buried in the ground or converted into jewellery—this last being perhaps the favourite alternative. It will thus be seen that the peculiar ideas and conditions of the people all tend to develop the craft of those who work in the precious metals. There is scarcely a village in India that has not its jeweller; in the larger towns they are of course numerous; and it will convey some idea of their numbers when it is stated that, according to official returns, there were in 1875, in Bombay, 2,875 goldsmiths, who found "constant and lucrative employment." In the villages of Afghanistan there are generally a few Hindus who act as traders, and among them will usually be found one who is a goldsmith and money-lender. There are "shrofs," or money-lenders, in all parts of India, but the jeweller is often the banker,

A Jeweller's Shop in Delhi.

and in most cases his productions, in the shape of ornaments, take the place of a deposit account.

In two countries so very opposite in many respects as England and India, it is very difficult for the people of each to form correct ideas regarding the other. I had a capital illustration of this with my servant in India, who was a very able and intelligent fellow; he had a great desire to come to England, and talking with him one day about it, I asked him what he would do about his food—he was a Mussulman, and animals have to be killed, as with the Jews, in a particular manner—"Oh, Sahib," he said, "I would go to the bazaar and buy a kid and kill it myself." He thought he saw his way quite clearly, but he was estimating the shops of London by the bazaars of India. It is the shops of the dealers which constitute a "bazaar"; and Jungli Khan, which was the man's name, would have had an interesting search along such bazaars as Oxford Street or the Strand for an establishment in which to buy a kid. Most people at home here may have just as strange notions of shops in India: they may naturally imagine that in a great city like Delhi—the old Imperial capital of Hindostan, that jewellers' shops will be rather handsomely got up; that plate glass windows will be laid out with bangles and other articles such as were seen at the late Indian Exhibition, which was supposed to represent India, and might, in this case, help the imagination.

A bazaar in India is generally a narrow dirty street, with a series of booths or open recesses which have neither doors nor windows, in these the people sit on the ground with their hips on their heels, either waiting for customers—if they are merely dealers—or at work on the particular articles they produce. The jeweller's shop in Delhi of which I give an illustration is rather a superior sort of place. It is built of the red sandstone which is peculiar to the locality, on which it will be seen there is some carving on the mouldings, and instead of thatch projecting to protect those within when the sun is strong, there is a purdah of striped cloth to stretch out. The reader may be assured that, for India, this represents rather a superior kind of an establishment: it is not a picture of the Clerkenwell, but the Regent or Bond, Street of Delhi. It will be noticed that the floor of the shop is a few feet above the level of the street; we have here a peculiarity of all shops in the bazaars of India; the principal object of this is to place the occupant and all his goods in a safe position from invasion by horses, cattle, or other animals passing in the street.

The marked feature of a Delhi jeweller's shop is the curious object formed not unlike the gigantic head of some monster fish; this is made of clay or mud, and holds the fire necessary for a goldsmith's operations—a fervent heat being produced by means of a blow-pipe. All the tools used by these men are of the simplest description; and the marvel is how they can produce the beautiful work for which they are celebrated with such very primitive materials. Europeans at times employ jewellers at their own bungalows; the man will bring his implements, with a small pot of fire, and will produce whatever is wanted, sitting on the floor of the verandah. He weighs the gold or silver which is supplied, and weighs it again when the articles are made, charging a very small sum for his day's work. Not long ago servants used to receive about six or eight shillings a month, on which they could feed themselves and keep their families. Jewellers would be paid better than this; still, the mode of estimating the finest work produced was to weigh the gold and add six per cent. as the value of the labour upon it. It may be noticed that the men in the picture have left their shoes outside the shop: this is an Eastern habit as old as the time of Moses. Near the shoes is the *chillum*, or water-pipe. It consists of a vase, which holds the water, with a wooden tube, on the top of which is the tobacco in a small cup. This is often referred to as the work goes on, and from the gurgling sound produced by the smokers, Europeans generally call it a "hubble-bubble." Although this sketch was made on the spot as far back as 1860, I remember that the bird in the cage was a *mina*: it is a kind of blackbird with a yellow bill, and some of them can speak a word or two. The cage was formed of slips of bamboo.

In Delhi there are men who go about with jewellery for sale. They are always on the look-out for the arrival of Europeans. These "sona-wallahs"—*sona* is the word for gold—will sit patiently before their expected customer, unfolding their articles, which are carefully wrapped up in bits of cotton cloth. I remember one day that a fellow had turned out a large stock, and by a little sleight of hand I transferred some of the objects into my pocket. When I reproduced them he gave a single smile, which might have meant that he had seen it all, or that he was confident the Sahib would not cheat him. When I paid him for some purchases I am not quite sure that I was quite so safe as he was in that respect; for they put on very high prices, and the stranger has considerable trouble in knowing what would be fair and just.

Already in this article some of the conditions which give work to the "sona-wallah" of India have been given, but it would take a long time to enumerate all. One or two more may be here hinted at. India is not celebrated for its pottery; there is manufacture of this kind, but it never reached the quality of such productions in China or Persia. Religious caste has been the original influence in this case. If a European in a village he passes through chances to get a drink out of a rude earthenware cup, he returns the cup with thanks, but he is astonished to see the vessel thrown away, or perhaps broken before his eyes; and he discovers, rather to his astonishment—probably producing at the moment a touch of anger—that his touch had defiled it. A metal dish can be purified by scouring with mud or sand and water: on this account nearly all domestic vessels, particularly those used for eating from, are of metal—brass is the usual material. We are familiar with porcelain from China; and here is the explanation of the brass articles generally called "Benares work"—which are so common now in the shops of London—from India. Few or none of those who deck their drawing-rooms with such articles are aware that they are an expression of Brahminical exclusiveness. Where the ordinary people use brass the wealthy—the Nawabs and Rajahs—will have silver and gold. A Rajah, who always eats alone, has his dinner brought in on a sort of dumb-waiter—the food being in a number of dishes. He eats with his fingers, and the dumb-waiter is turned round to bring each dainty within reach. The dumb-waiter will be of silver-gilt, and the dishes may be either silver or gold, and all ornamented. Here it will be seen that the dinner table of the rich in India, with all its belongings, is the production of workers in the precious metals. The state howdahs—that is, the seat fixed on the back of the elephant—of Rajahs are usually of silver-gilt, and are highly ornamental and often enriched with jewels. The state howdah of the Viceroy is a very handsome one of silver. Chairs of state are the same; there was one which had been sent as a present to the Prince of Wales, in the Durbar Hall of the late Indian and Colonial Exhibition. The throne of the Viceroy is of silver, with gilt lions for the arms, and the emblems surmounted by a crown of the Order of the Star of India on the back. The celebrated peacock throne of the Emperors of Delhi was so enriched with precious stones that it was specially a work of the jeweller's craft.* Rajahs have always carried in their presence on state occasions a number of royal insignia; they are of silver, highly ornamented and gilt. Most of the Hindoos have small shrines in their houses; these are small ornamental stands, with figures of their gods upon them. The greater quantity of such articles are of brass, but with the wealthy they are made of the precious metals, and often with jewels upon them, the gifts of their votaries. The story of "The Moonstone," by Wilkie Collins, is based on a celebrated stone that had belonged to one of the celebrated gods of India, and the Koh-i-Noor is also reputed to have at one time belonged to an idol. These very slight sketches of the requirements of life as it is in India—and it has been the same for ages back—will show you how great must be the demand upon the jeweller and the worker in the precious metals.

* This throne, which was of the form of a peacock, covered with jewels, was carried off from Delhi by Nadir Shah. It, or what is left of the original, is said to be now in Terhan, and I regret much that I missed seeing it when in that city about three years ago. According to some accounts the throne was broken up at Delhi, and Nadir had only a copy of it made on his return to Persia.

The Emperors of Delhi had within the palace boundaries a large establishment of all kinds of skilled artisans ; these included painters, inlayers of gold and damascene workers—who were principally employed in decorating weapons—enamellers, embroiderers, jewellers and workers in gold, silver, crystal and carnelian. The *Ayin Akbary* gives a detailed list of the great number of people who were thus employed by the Emperor Akbar. He personally superintended the work and rewarded all who showed signs of superior ability. Jade articles may be said to be almost peculiar to China, but the Mogol Emperors introduced the manufacture of articles from it ; the Chinese only carve the jade, but in India it was not only cut, but encrusted with gems. Some of the finest specimens of this work are in the Indian Collection at South Kensington—from the Guthrie Collection, if I am not mistaken—among them is a bowl on which it is said one family in Delhi were employed for three generations.

The Princes of India had similar establishments to that at Delhi; and there is reason to suppose that those who had the means kept skilled workmen about their houses. Rajendralila Mitra, a learned Sanscrit scholar of India, quotes* from a play written in the first century of the Christian era, called the "Toy Cart," which describes the scene in the court-yard of a courtezan's house, where there are "jewellers' shops," and "skilful artists were examining pearls, topazes, sapphires, emeralds, lapislazuli, coral and other jewels; some set rubies in gold, some work gold ornaments on coloured thread, some string pearls, some grind the lapislazuli, some pierce shells, and some cut coral." From the same play, Rajendralila Mitra gives us another aspect of the jeweller's trade at that early date. It is evidence, from what follows, that those who could not afford genuine articles had imitations to wear, so that the fabrication of false jewellery was a practised one. There is a passage in the "Toy Cart" which deals with the indentity of certain ornaments, which takes place in a court of justice. A question is asked by the Judge: "Do you know these ornaments?" *Mother*—"Have I not said? They may be different, though like ; I cannot say more ; they may be imitations made by some 'skilful artist.'" *Judge*—"It is true. Provost, examine them ; they may be different, though like—the dexterity of the artists is no doubt very great, and they really fabricate imitations of ornaments they have once seen and in such a manner that the difference shall scarcely be discernable." The Judge here pays a very high compliment to the ability of the workman. As far back as the laws of Manu there were punishments for the debasing of gold with inferior metal ; there were also in the same code a curious law that a fine was to be imposed for "piercing fine gems as diamonds or rubies, and for boring pearls or inferior gems improperly."† The spirit of the legislation would seem to be that precious stones, from their indestructible character, did not altogether belong to the holder of them for the time, and that he had no right to injure or destroy such objects, which should descend intact to posterity. If this is the spirit, Cleopatra, had she lived under such laws, might have got a sentence of twelve months when she dissolved the pearl.

## The Deeds of Arrangement Registration Act.

THE Deeds of Arrangement Registration Act, 1887 (50 & 51 Vic., c. 57), provides that every deed of arrangement between a debtor and his creditors shall be absolutely void unless it is registered with the Registrar of Bills of Sale within seven days of the first execution, by the debtor or any creditor. A register of deeds of arrangements is to be kept, showing the date of the deed, the name, address and description of the debtor, with the titles of his firms and the addresses of his places of business ; a short statement of the effect of the deed ; the date of registration ; and the amount of property and liabilities included in the deed. This register may be inspected at any time by any person on payment of a shilling fee, and copies of any deed of arrangement may be procured. The register is not to be confined to London. Whenever the debtor's place of business or residence is outside the London Bankruptcy District, the registrar is, within three days of the registration of the deed, to transmit a copy of the deed to the County Court in the district of which the debtor's place of business or residence is situated. Thus there will not only be a register for all England at London, but in every town there will be a register, equally accessible to the public, of all the local transactions of the kind. It will be a difficult matter to discover a loophole in the Act. The term "deed of arrangement," as used in the Act, receives a very precise and exhaustive definition. The term is to include any instrument, whether under seal or not, made by, or for, or in respect of the affairs of a debtor, for the benefit of his creditors generally, whether it takes the shape of an assignment of property or a deed of, or agreement for, a composition ; and it is to include cases in which creditors obtain any control over the business or property of a debtor, so that a deed of inspectorship for the purpose of carrying on or winding-up a business, and a letter of license, agreement, or instrument authorising the debtor or any other person to carry on or to realise a business, with a view to the payment of his debts (a definition which will include the arrangement so often made by which creditors join in giving a debtor time in which to pay his debts), will require registration. Deeds of arrangement are to be burdened with a stamp duty, in addition to that now imposed by the Inland Revenue, of 1s. per cent. upon the sworn value of the property passing by the deed, or the amount of composition payable under the deed. The Bankruptcy Act, 1883, is subjected to a small but important emendation. One of the causes mentioned in the Act for which the Court may refuse, or suspend, or make conditional the discharge of a bankrupt, is "that the bankrupt has upon any previous occasion made a statutory composition or arrangement with his creditors." The present Act strikes the word "statutory" out of this provision. Henceforward the fact that a bankrupt has made a private arrangement with his creditors will operate against the obtaining of his discharge. The Act applies to Ireland, but does not apply to Scotland.

## Mining in New South Wales.

RECENT advices show that the operations at the various mining centres have retained the increased activity recently reported. A few fresh discoveries of gold, silver, tin and lead-bearing localities have been recorded, although no further phenomenal yields are on record. The boom in silver shares has continued almost without abatement, and the interchange of scrip has been a marked feature on the Mining Exchange. It appears to be evident that the proved extensiveness of the New South Wales argentiferous districts is causing what may be in some fairness compared to a mining revolution. The successes of individual proprietaries have induced capitalists to risk their moneys for prospecting purposes, with the general result that new finds, with attendant satisfactory mint assays, have been forthcoming. In connection with tin-mining also, increased prosperity has to be recorded. Gold-getting, despite intermittent fluctuations, continues to be brisk. Several new fields have been opened up in comparatively unexpected quarters, and a steady yield is reported from most of the recognised reefing and alluvial quarters. In diamonds but little is doing, the owners of the fields having been for some time in communication with English and Continental syndicates and capitalists in reference to opening up our diamond-bearing drifts upon a wholesale scale. It has been somewhat conclusively pointed out that to ensure a payable return in this particular connection, operations will have to be carried out upon a much more extensive scale than has been heretofore the case. In four or five districts the existence of probably millions of diamonds has been established beyond a doubt, but their size, lustre and general merit are such that (so far as has been ascertained up to the present time) quantity must be relied upon to ensure an European market. The upper drifts on the diamond-bearing grounds have only been tapped, but a movement is on foot to expend capital in the opening up of lower strata, in which, it is confidently believed, the larger and purer class of stones may be looked for. Copper-getting continues active.

* "Indo-Aryans," Vol. I., p. 239. † Ibid.

# The Lever Escapement

## CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. GROSCLAUDE, Professor at the Geneva School of Horology.

(TRANSLATED FROM THE FRENCH.)

*(Continued from page 76.)*

### THE DRAW.

LET us now say a few words of the "draw" in order to have finished concerning the form of the escapement. What is the draw for? Is it for the purpose of equalising the resistance to disengagement of the pallets from the wheel? or is it that, should the anchor become accidentally displaced, the wheel may bring it back into place in order to eliminate all friction of the dart upon the roller? It seems to us that this latter is the true object.

Now, when will this draw be *nil?* that is to say, when will it not have the effect of driving the anchor in any sense, as if it had no friction? This will be when it presses upon a surface perpendicular to a radius going from the point of the tooth to the centre of the anchor, *which should give the position of the centre of the wheel.* But if it be required that this pressure bring back the fork against the safety stops, this surface must be inclined a certain number of degrees sufficiently to overcome the resistance due to friction. An angle of 12° is enough, because the passing inertia neutralises all friction up to 0, 20. Proceeding then, at the entering lift (equidistant lockings, fig. 1, page 75) the flank of the pallet *m h* makes an angle of 12° with the perpendicular *m z* erected upon the radius *e r*.

It may be remarked that when the entering pallet leaves the tooth, the draw of 12° is increased to 13½°, since the anchor makes 1½° before the tooth can act upon the incline of the pallet, while, if the exit pallet has similarly 12° at the commencement, it will be reduced to 10½° when the point of the tooth leaves the locking.

We will give, then, to this latter pallet at first a draw of 13½°, for two reasons: in the first place so that it be always at least 12°; and to obtain at the same time the advantage of the wheel offering the same resistance to unlocking upon the two faces, because, upon the first, the draw will go from 12° to 13½°, while, upon the second, it will go from 13½° to 12°. The mean will then be the same.

The equidistant pallets do not afford the same facilities for obtaining the draw, the corner of the tooth being at a different distance from the centre of the anchor. To obtain the impulse angle it is sufficient that it have at least 12°, and the same results might be obtained as in the escapement with equidistant lockings. But if, at the same time, the effort of disengagement is to be the same for both pallets, the draw of the exit pallet must be increased inversely as the lengths of the pallet arms from the respective lockings to the centre of the anchor. This calculation gives 16½° of draw for the exit pallet, and 15° at the moment the tooth leaves the locking. The angle, it is true, is greater than is necessary to assure the impulse, but, on the other hand, the draw is thus equalised.

It is then, with the line *m z*, perpendicular upon *e r*, at the entrance pallet, that an angle of 12° is formed, and at the exit pallet, with the line *m' z'*, perpendicular upon the line *e' r*, that the angle of 16½° is formed.

### THE IMPULSE.

Having seen the proper mode of drawing the escapement, so as to give always to the anchor the exact angular movement proposed, modifying at will the relations of the inclines upon the pallet, and upon the tooth and the form of the pallets, the question which naturally presents itself is: which of all these designs should be chosen as giving the best means of transmitting the motive force at our disposal? To this we reply that if the questions relating to the oils, inertia of the matter, and friction be left out, and an equal drop be adopted for all, all the forms are of equal value. As this contention may appear somewhat extraordinary to some of our readers, they would do well to allow us to explain here some mechanical principles too frequently ignored.

Every machine or mechanical combination has for aim the transmission of the motive force, or *work*.

By *work* is meant the product obtained by multiplying the pressure, the force, or the resistance, by the distance traversed.* In the case in which we are interested, the work done by the escape wheel during one impulsion is equal to the pressure exerted by the point of the tooth, multiplied by the distance traversed by that point during one impulsion. Assuming that this point exerts a pressure of ten units of weight, and that the space traversed by the point of the tooth during one impulsion (corresponding to an angular movement of 12° of the wheel) be ten linear units, the work transmitted by this wheel at each impulsion will be expressed by $10 \times 10 = 100$.

We have taken for the distance traversed by the point of the tooth, and the pressure it exerts in a point of the circumference of the wheel, arbitrary quantities, because this study is only for the purpose of comparing different systems and not of measuring absolute quantities.

It is important to observe that the amount of work the escape wheel has to transmit to the balance is exactly the same whatever be the point of the wheel from which it is calculated. Thus, if we take a point in the wheel at half the distance from its centre, it will exert double the pressure, but at the same time the lineal distance it will travel over for an angular movement of 12° of the wheel will be only half, the product of the two quantities remaining the same.

This motive force is not transmitted entirely to the balance, by reason that the tooth of the wheel does not act continually during the 12°, because the action should be followed by a drop of 2° at least for the wheel with pointed teeth, and of 1½° for the others. In the former case it can only transmit 10-12ths, or 83⅓ per cent. of work, and, in the latter, only 10½-12ths or 87½ per cent.

All things being otherwise equal, it will be advantageous to diminish the drop as much as possible, because, as we have before seen, for each ½° or drop saved we economise more than 4 per cent. of transmitted work. In fact, there the work is absolutely lost, because there results from the drop upon the locking face of the pallet a shock which has no other effect than of producing wear. In mechanics shocks are always to be avoided, as they present only inconveniences with no compensating advantages. It is of course understood that we except the case where the shock is sought for the purpose of forging, for example; but even then, mechanicians have recognised that if the same end can be obtained by pressure, it is better to use it.

In our case, in the meantime, the drop cannot be completely avoided because we have to take into account the irregularities, more or less inseparable, for execution; and as it is necessary to insure the freedom of the pieces, it must be accepted.

Now, is the work done by the wheel during one impulsion transmitted to the anchor as well by one of our designs as by the other? We reply affirmatively, if, we repeat, the influence of inertia and of friction be subtracted. In effect, the work, performed in the manner before explained, transmits itself always in totality, whatever be the mechanism employed to transmit it.

Let us take some examples outside horology. What effort must be exerted to raise a weight by means of a pulley? An effort equal to the weight, because the distance traversed by the force is equal to that traversed by the resistance.

In a system of tackle of three pulleys in one, a weight six times as great as the force exerted upon the cord can be lifted, but the speed is six times less. Let us consider again the platform scales which are used for weighing bulky goods, such as waggon loads of materials, hay, &c.; if a weight of 1 kilogramme,

* In mechanics, the unit of work adopted is the work done in raising 1 kilogramme to the height of 1 mètre, or in a more general manner, a resistance of 1 kilogramme overcome in a distance of 1 mètre, and this unit is called a *kilogrammètre*. Another unit, by means of which dynamics of different forces may be compared, is the *horse power*, which is equal to 75 kilogrammètres produced in 1 second; thus, a steam engine of 1 horse power is that which can raise 75 kilogrammes to the height of 1 mètre in 1 second, or 1 kilogramme to 75 mètres in 1 second, or lastly, 1 kilogramme to 1 mètre in 1-75th second.

placed upon the beam, succeed in balancing 1,000 kilogrammes, any vertical movement of the goods will have a corresponding movement of the weight exactly 1,000 times greater.

The pressure exerted by the tooth of the centre wheel would be 60 times weaker measured upon the tooth of the seconds' wheel if these two wheels were of the same size, because the one tooth would travel 60 times further than the other. We always find the same product of the pressure by the distance traversed, whatever point of the machine we calculate it from. It is from this the well-known law proceeds, that *what is gained in power is lost in speed.*

Passing now to a rather more complicated example, that of the piston of a steam-engine acting by the intermediary of a bearing upon a crank. Supposing this latter turns an arbor on which is wound a cord carrying a weight at its extremities. Assume that the diameter of the arbor be such that its circumference is equal to the distance travelled through by the piston during one turn of the arbor; the result will be that the piston for any number of turns of the arbor will travel through the same distance as the weight to be raised. In this particular case the weight the machine will be able to raise will be exactly equal to the pressure exerted upon the piston. It is well known that with a crank the force or pressure transmitted varies at each instant; it attains its maximum when the bearing rod acts perpendicularly upon the crank, and it becomes *nil* at the dead points. This irregularity in the impulsion, following the different positions of the crank, has not then the effect of interfering with the transmission of total work.

From the preceding we must conclude that if, from an equal angular movement of the wheel, we obtain an always equal angular movement of the anchor and its fork, the mean pressure exerted will be always equal, whatever be the form adopted. Nevertheless we would point out that we have not said that the pressure of the escape wheel would be transmitted in a uniform manner throughout the whole duration of an impulse, but only that the total transmission of the work will be the same.

Then, in order to choose among the different data for making the most mechanically advantageous design, we must abandon all that concerns the theoretical impulse and limit our study to the causes which may modify it; and these causes, which we shall have to examine successively, are the numerous resistances, in particular those of the oils, of the inertia of the matter, and above all, of the friction.

### Inertia and Shocks.

Setting out from the principle that matter continues in the state in which it is found; that is to say, that a body in repose cannot be moved by itself, and that a body in movement will continue that movement indefinitely unless somh perturbing force act upon it, it results that each time we shall have to alter the speed of a body, either by accelerating it or tetarding it, we must expend work. The resistance matter offers to a change of speed is called *inertia.* It would be well to know whether or not the work necessarily expended in order to overcome it is to be grudged. But this resistance is only really hurtful when it leads to shocks between non-elastic bodies. Let us take some examples in order to make this understood.

Supposing several workmen are pushing a railway waggon in order to put it in motion. Many resistances, such as frictions and the resistance of the air, will have to be overcome, but it is to the resistance of the inertia of the mass of the waggon that the principal expenditure of labour is due. If the labourers at a given moment cease to push the waggon forward, the latter will continue in motion indefinitely upon a level railway, allowing the non-existence of friction and the other resistances. But these resistances cannot be got rid of, and the speed acquired by the waggon is utilised in overcoming them and preserving the movement for a certain time. The work expended in the first place finds here, then, its employment. It is seen by this that the property of inertia of matter is often advantageous, in that it allows of the storage of work in the form of *vital force;* the only work really expended and lost, without useful results, is that caused by injurious resistances, frictions, shocks, resistances of the air, &c.

The fly-wheel of a steam-engine, heavy in itself, only loses work on account of the increased friction due to the heavy weight of the wheel. If by reason of this great mass it requires a little more time to attain a determined speed, the machine benefits by having a more regular one and the power to continue its function, which the motive power by itself would not be equal to were it to be discontinued for a moment. The preceding example is equally applicable to the balance of a chronometer. A billiard player exerts an effort to give an impulse to a billiard ball; this last will continue its motion even after striking the cushions, and will only stop, if these are perfectly elastic, on account of the friction produced by the cloth.

An elastic ball falling to the ground will rebound to nearly the same height from whence it dropped; but in the case of a non-elastic substance, such as a ball of lead, it will remain on the ground and all the work produced by the drop will be absorbed by a deformation of the matter and a production of heat.

We have said that shocks between elastic bodies do not expend any work; this is only true, however, if the elasticity is perfect—and, unfortunately, this condition is not absolutely realised by any body. We have bodies more or less elastic, but none attains perfection in this respect. So we must conclude that shocks are always to be avoided; while it is not so of the inertia of matter so long as it does not result in shocks.

Let us now consider what takes place in an escapement that is in action. The balance oscillates its full amplitude. The ruby pin is taken by the fork at the instant the balance has acquired its greatest speed. As the spring is almost at rest at this moment, we may consider the movement of the balance uniform; and since the fork is forced to participate in this movement, the anchor will also have a sensibly uniform motion. This will be so much the more true inasmuch as the mass of the balance will be greater with respect to that of the anchor and its fork. The latter must then pass suddenly from rest to the same speed; so that we have here a very serious shock, which will certainly produce temporary perturbations, detrimental to the good performance of the escapement. The inventive genius of our readers might here be exercised with advantage in the direction of finding a mechanical disposition of the ruby pin and the fork that would permit of giving the movement to the anchor without shock. We have then to consider the pallet moving before the tooth with a uniform speed sufficiently great. Assuming the escape wheel to have a given mass, it will have to pass from rest to motion; for this a certain time is necessary—as much longer as the motive force is less and as the mass of the wheel is greater. This case presents itself where the tooth only comes in contact with the incline of the pallet for a quarter or third of its length, &c. The condition will be plainer if it be observed that when the tooth leaves the locking free of the pallet, the wheel makes a slight quick retrograde movement, which still further retards the instant when the point of the tooth comes in contact with the incline of the pallet. It is not easy to verify the importance of this retardation in the contact, since it is only observable when the balance is vibrating at a high speed. Practical men who have had in hand escapements, anchor, cylinder, &c., that have been going a long time, will, however, be in accord with the foregoing considerations if they examine those parts of the inclines which have been worn.

The above observations indicate a shock that it is important to get rid of. This is arrived at by diminishing as much as possible the weight of the escape wheel without weakening it too much. Another means would be by devising such a combination of forms of levers, that to a uniform movement of the pallet a corresponding movement of the wheel be given, which should somewhat resemble the action of the piston and crank of a steam-engine. In this case the piston passes from rest to a rapid motion, and from the latter to rest by an insensible progression; thus each deperdition of force is imperceptible, since there is no point of shock. For the escape wheel with pointed teeth, an incline of a form which would give the required result could be contrived: one part would be convex and the other concave.

*(To be continued.)*

# ABSTRACT OF THE PRINCIPAL CHANGES OF RATE DURING THE FIFTEEN

## AT THE ROYAL OBSERVATORY, GREENWICH,

| NAME OF MAKER. | No. | Whether 2 or 8 Days. | ADDRESS OF MAKER. | Construction of Escapement and Balance, from the Description furnished by the Maker. | Least Weekly Rate. | Extremes of Temperature. |
|---|---|---|---|---|---|---|
| | | | | | s | ° ° |
| Uhrig | 458 | 2 | 8, Quadrant Road, Essex Road, N. | Uhrig's continually acting auxiliary. | — 12·1 | 88·0—91·0 |
| Mercer | 4592 | 2 | Prospect Road, St. Albans, Herts. | Auxiliary compensation. | — 18·9 | 44·0—54·0 / 92·0—95·0 |
| C. Frodsham and Co. | 0011 | 2 | 84, Strand, W.C. | Ordinary Balance. | — 15·2 | 48·0—58·0 |
| Johnson and Son | 3780 | 2 | 35, Victoria Street, Derby. | Auxiliary compensation acting in extremes of temperature. | — 4·2 | 44.0—54·0 |
| Johnson and Son | 3779 | 2 | 35, Victoria Street, Derby. | | + 1·6 | 48·0—58·0 |
| Hume | 2013 | 2 | No. 6 Side, Newcastle-on-Tyne. | Auxiliary compensation for heat. | + 2·9 | 64·1—71·8 |
| Kullberg | 4689 | 2 | 105, Liverpool Road, N. | Reversed detent, with short spring. | + 4·4 | 49·3—59·0 |
| Johannsen and Co. | 3500 | 2 | 149, Minories, E.C. | Auxiliary acting in heat and cold. | — 1·6 | 64·1—71·8 |
| Johannsen and Co. | 3516 | 2 | 149, Minories, E.C. | Auxiliary acting in heat. | — 0·4 | 48·0—58.0 |
| Johannsen and Co. | 3588 | 2 | 149, Minories, E.C. | Auxiliary acting in heat and cold. | — 6·6 | 64·1—71·8 |
| Isaac | 1670 | 2 | 10, Spencer Street, Clerkenwell, E.C. | Palladium balance spring. | — 3·4 | 64·1—71·8 |
| Uhrig | 450 | 2 | 8, Quadrant Road, Essex Road, N. | Uhrig's continually acting auxiliary. | — 17·1 | 44·0—54·0 |
| David Reid | 1788 | 2 | 39, Grey Street, Newcastle-on-Tyne. | Auxiliary compensation. | — 25·3 | 64·1—71·8 |
| Webster | 16968 | 2 | 5, Queen Victoria Street, E.C. | Palladium balance spring. | — 5·0 | 54·9–61·9 |
| Hume | 2014 | 2 | No. 6 Side, Newcastle-on-Tyne. | Auxiliary compensation. | + 3·7 | 88·0—90·3 |
| Pyott | 887 | 2 | 74, West India Dock Road, E. | Auxiliary compensation. | + 2·1 | 44·0—54·0 |
| Isaac | 1688 | 2 | 10, Spencer Street, Clerkenwell, E.C. | Ordinary balance; bright steel spring. | — 13·7 | 40·4—51·5 |
| Kullberg | 4738 | 2 | 105, Liverpool Road, N. | Reversed detent, with short spring. | + 7·5 | 88·0—90·3 |
| Oram and Son | 18432 | 2 | 19, Wilmington Square, W.C. | Auxiliary compensation. | — 10·3 | 88·0—90·3 |
| Brockbank and Atkins | 2038 | 8 | 6, Cowper's Court, Cornhill, E.C. | Ordinary balance. | — 3·5 | 40·4—51·5 |
| Mann | 4603 | 2 | The Cross, Gloucester. | | — 9·8 | 40·4—51·5 |
| Reid and Sons | 867 | 2 | 41, Grey Street, Newcastle-on-Tyne. | Auxiliary compensation. | — 8·0 | 48·0—58·0 |
| Glover | 366 | 2 | 8, Wrotham Road, Camden New Town. | Ordinary balance, with auxiliary acting in heat. | — 18·8 | 92·0—96·0 |
| Edward and Sons | 4936 | 2 | 1, Poultry, E.C. | | + 0·3 | 39.0—55·2 |
| Williams | 4465 | 2 | 3, Bute Docks, Cardiff. | Ordinary balance, with auxiliary compensation. | — 29·3 | 64·1—71·8 |
| Davison | 3367 | 2 | No. 6 Side, Newcastle-on-Tyne. | Auxiliary compensation. | — 6·4 | 40·4—51.5 |
| Keys | 888 | 2 | 15, Craven Street, Strand, W.C. | Improved balance. | + 0·7 | 48·0—58·0 |
| C. Frodsham and Co. | 0012 | 2 | 84, Strand, W.C. | Ordinary balance. | — 9·2 | 92·0—95·0 |
| Webster | 16704 | 2 | 5, Queen Victoria Street, E.C. | Ordinary balance. | — 21·7 | 92·0—95.0 |
| Oram and Son | 11/715 | 2 | 19, Wilmington Square, W.C. | Ordinary balance. | — 0·4 | 40·4—51·5 |
| Webb | 510 | 2 | 90, High Street, Islington, N. | Auxiliary compensation acting in heat. | — 15·1 | 64·1—71·8 |
| Webb | 513 | 2 | 90, High Street, Islington, N. | Auxiliary compensation acting in heat. | + 8·9 | 64·1—71·8 |
| James Poole and Co. | 5800 | 2 | 33, Spencer Street, Clerkenwell, E.C. | Poole's auxiliary. | -- 22·5 | 88·0–90·3 |
| Reid and Sons | 5785 | 2 | 41, Grey Street, Newcastle-on-Tyne. | Poole's auxiliary. | — 2·9 | 54·9—61·9 |
| Hewitt | 5626 | 2 | 4, Spencer Street, Clerkenwell, E.C. | Poole's auxiliary. | — 25·3 | 92·0—96·0 |
| Sewill | 4420 | 2 | 30, Cornhill, E.C. | Ordinary balance. | — 16·1 | 40·4—51·5 |
| Hewitt | 5552 | 2 | 4, Spencer Street, Clerkenwell, E.C. | Poole's auxiliary. | — 6·3 | 48.0—58·0 |
| Keys | 884 | 2 | 15, Craven Street, Strand, W.C. | Auxiliary compensation. | — 2·3 | 48.0—58.0 |
| Brockbank and Atkins | 2054 | 2 | 6, Cowper's Court, Cornhill, E.C. | Ordinary balance. | — 16·8 | 40·4—51·5 |
| Williams | 8798 | 2 | 3, Bute Docks, Cardiff. | Ordinary balance, with auxiliary compensation. | — 3·6 | 88·0—91·0 |
| Sewill | 4419 | 2 | 30, Cornhill, E.C. | Ordinary balance. | — 15·5 | 40·4—51·5 |
| Sewill | 4418 | 2 | 30, Cornhill, E.C. | Ordinary balance. | — 16·6 | 40·4—51·5 |
| Oram and Son | 19181 | 2 | 19, Wilmington Square, W.C. | Auxiliary compensation. | — 2·3 | 60·3—66·5 |
| Webster | 15083 | 2 | 5, Queen Victoria Street, E.C. | Ordinary balance. | — 26·2 | 60·3—66.5 |
| Pyott | 878 | 2 | 74, West India Dock Road, E. | Ordinary balance, with slight alteration. | — 2·7 | 92·0—95·0 |
| Mercer | 4827 | 2 | Prospect Road, St. Albans, Herts. | Auxiliary compensation. | — 10·5 | 40·4—51·5 |
| David Reid | 850 | 2 | 39, Grey Street, Newcastle-on-Tyne. | Auxiliary compensation. | — 10·8 | 44·0—54.0 |
| Oram and Son | 19107 | 8 | 19, Wilmington Square, W.C. | Ordinary balance. | + 4·9 | 92·0—95·0 |
| Klean and Co. | 1006 | 2 | 70, Myddelton St., Clerkenwell, E.C. | Poole's auxiliary. | — 10·4 | 44·0—54·0 |
| C. Frodsham and Co. | 3600 | 8 | 84, Strand, W.C. | Ordinary balance. | — 15·0 | 88.0—90.3 |
| James Poole and Co. | 5801 | 2 | 33, Spencer Street, Clerkenwell, E.C. | Poole's auxiliary. | — 13·0 | 40·4—51·5 |
| Schoof | 6059 | 2 | 99, St. John's Street Road, E.C. | Schoof's resilient lever escapement. | — 7·8 | 88·0—90·3 |

The sign + indicates that the rate is gaining.

# WEEKS OF CHRONOMETERS ON TRIAL FOR PURCHASE BY THE ADMIRALTY, FROM MARCH 5, 1887, TO JUNE 18, 1887.

| Mean Temperature. | Greatest Weekly Rate. | Extremes of Temperature. | Mean Temperature. | Difference between the Greatest and Least. (a) | Greatest Difference between one Week and the next. (b) | Mean Temperatures for these two Weeks. | $a+2b$ | NAME OF MAKER. | No. |
|---|---|---|---|---|---|---|---|---|---|
| ° | s | ° — ° | ° | s | s | ° — ° | s. | | |
| 89·8 | — 7·2 | 39·0 — 55·2 | 48·3 | 4·9 | 3·3 | 48·3 — 89·4 | 11·5 | Uhrig | 458 |
| 47·6 } | — 12·9 | 49·3 — 59·0 | 53·8 | 6·0 | 4·0 | 63·6 — 68·3 | 14·0 | Mercer | 4592 |
| 93·7 } | | | | | | | | | |
| 54·3 | — 7·0 | 64·1 — 71·8 | 68·3 | 8·2 | 3·5 | 58·0 — 63·6 | 15·2 | C. Frodsham and Co. | 0011 |
| 47·6 | + 4.1 | 49·3 — 59·0 | 53·8 | 8·3 | 5·5 | 54·3 — 52·9 | 19·3 | Johnson and Son | 3780 |
| 54·3 | + 10.5 | 88.0 — 91·0 | 89·8 | 8·9 | 6·1 | 93·7 — 54·3 | 21·1 | Johnson and Son | 3779 |
| 68·3 | + 11·3 | 40·4 — 51·5 | 45.2 | 8.4 | 7·1 | 48·3 — 89·4 | 22·6 | Hume | 2013 |
| 53·8 | + 14·5 | 92.0 — 96·0 | 94.3 | 10·1 | 6·4 | 53·8 — 89·8 | 22·9 | Kullberg | 4689 |
| 68·3 | + 7·5 | 92·0 — 96·0 | 94.3 | 9·1 | 6·9 | 94·3 — 58·0 | 22·9 | Johannsen and Co. | 3500 |
| 54·3 | + 11·7 | 40·4 — 51·5 | 45·2 | 12.1 | 5·8 | 47·6 — 45·2 | 23·7 | Johannsen and Co. | 3516 |
| 68·3 | + 5·3 | 92.0 — 95·0 | 93·7 | 11·9 | 5·9 | 93·7 — 54·3 | 23·7 | Johannsen and Co. | 3588 |
| 68.3 | + 6·7 | 88·2 — 94·9 | 92·6 | 10·1 | 6·9 | 48·3 — 89·4 | 23·9 | Isaac | 1670 |
| 47·6 | — 5·2 | 92·0 — 95·0 | 93·7 | 11·9 | 6·1 | 48·3 — 89·4 | 24·1 | Uhrig | 450 |
| 68·3 | — 14·6 | 90·2 — 95·8 | 93·6 | 10·7 | 7·2 | 94·3 — 58·0 | 25·1 | David Reid | 1788 |
| 58·0 | + 7·1 | 39·0 — 55·2 | 48·3 | 12·1 | 7·0 | 94·3 — 58·0 | 26·1 | Webster | 16968 |
| 89·4 | + 15·3 | 92·0 — 96·0 | 94·3 | 11·6 | 7·4 | 89·4 — 92·6 | 26·4 | Hume | 2014 |
| 47·6 | + 19·2 | 92·0 — 96·0 | 94·3 | 17·1 | 5·6 | 53·8 — 89·8 | 28·3 | Pyott | 887 |
| 45·2 | + 6·4 | 64·1 — 71·8 | 68·3 | 20·1 | 5·1 | 94·3 — 58·0 | 30·3 | Isaac | 1688 |
| 89.4 | + 18·5 | 49·3 — 59·0 | 53·8 | 11·0 | 9·7 | 93·7 — 54·3 | 30·4 | Kullberg | 4738 |
| 89·4 | + 4.3 | 49.3 — 59·0 | 53·8 | 14·6 | 8·3 | 53·8 — 89·8 | 31·2 | Oram and Son | 18432 |
| 45·2 | + 12·8 | 64·1 — 71·8 | 68·3 | 16·3 | 7·6 | 48·3 — 89·4 | 31·5 | Brockbank & Atkins | 2038 |
| 45·2 | + 8·8 | 64·1 — 71·8 | 68·3 | 18·6 | 7·5 | 94·3 — 58·0 | 33·6 | Mann | 4603 |
| 54·3 | + 7·2 | 40·4 — 51·5 | 45·2 | 15·2 | 9·3 | 94·3 — 58·0 | 33·8 | Reid and Sons | 867 |
| 94·3 | — 5·8 | 60·3 — 66·5 | 63·6 | 13·0 | 10·9 | 94·3 — 58·0 | 34·8 | Glover | 366 |
| 48·3 | + 16·4 | 64·1 — 71·8 | 68·3 | 16·1 | 9·5 | 94·3 — 58·0 | 35·1 | Edward and Sons | 4936 |
| 68·3 | — 13·2 | 92·0 — 95·0 | 93·7 | 16·1 | 9·5 | 93·7 — 54·3 | 35·1 | Williams | 4465 |
| 45·2 | + 7.2 | 88.0 — 90·3 | 89·4 | 13·6 | 10·9 | 48·3 — 89·4 | 35·4 | Davison | 3367 |
| 54.3 | + 14·4 | 49·3 — 59·0 | 53·8 | 13·7 | 11·2 | 93·7 — 54·3 | 36·1 | Keys | 888 |
| 93·7 | + 5·8 | 44·0 — 54·0 | 47·6 | 15·0 | 11·2 | 48·3 — 89·4 | 37·4 | C. Frodsham and Co. | 0012 |
| 93·7 | — 5·9 | 39·0 — 55·2 | 48·3 | 15·8 | 11·2 | 93·7 — 54·3 | 38·2 | Webster | 16704 |
| 45·2 | + 15.5 | 54·9 — 61·9 | 58 0 | 15·9 | 11·3 | 94·3 — 58·0 | 38·5 | Oram and Son | $\frac{11}{715}$ |
| 68·3 | + 3.3 | 49·3 — 59·0 | 53·8 | 18·4 | 10·5 | 53·8 — 89·8 | 39·4 | Webb | 510 |
| 68·3 | + 30.9 | 92·0 — 96·0 | 94·3 | 22.0 | 8·9 | 58·0 — 63·6 | 39·8 | Webb | 513 |
| 89·4 | — 6·6 | 49·3 — 59.0 | 53·8 | 15·9 | 12·1 | 93·7 — 54·3 | 40·1 | James Poole and Co. | 5800 |
| 58·0 | + 16·8 | 39·0 — 55·2 | 48·3 | 19·7 | 10·8 | 48·3 — 89·4 | 41·3 | Reid and Sons | 5785 |
| 94·3 | — 2·6 | 39·0 — 55·2 | 48·3 | 22·7 | 9·4 | 89·8 — 93·6 | 41·5 | Hewitt | 5626 |
| 45·2 | + 9·1 | 64·1 — 71.8 | 68·3 | 25·2 | 8·2 | 48·3 — 89·4 | 41·6 | Sewill | 4420 |
| 54·3 | + 8·0 | 88·0 — 90·3 | 89·4 | 14·3 | 13·9 | 94·3 — 58·0 | 42·1 | Hewitt | 5552 |
| 54·3 | + 20·7 | 64·1 — 71·8 | 68·3 | 23·0 | 10·3 | 93·7 — 54·3 | 43·6 | Keys | 884 |
| 45.2 | + 8·0 | 64.1 — 71·8 | 68·3 | 24·8 | 9·7 | 47·6 — 45·2 | 44·2 | Brockbank & Atkins | 2054 |
| 89·8 | + 12·5 | 50·0 — 57·2 | 52·9 | 16·1 | 15·2 | 53·8 — 89·8 | 46·5 | Williams | 8798 |
| 45·2 | + 12·2 | 64·1 — 71·8 | 68·3 | 27·7 | 10·7 | 48·3 — 89·4 | 49·1 | Sewill | 4419 |
| 45·2 | + 8·1 | 64·1 — 71·8 | 68·3 | 24·7 | 12·7 | 94·3 — 58·0 | 50·1 | Sewill | 4418 |
| 63·6 | + 21·2 | 92·0 — 96·0 | 94·3 | 23·5 | 13·5 | 94·3 — 58·0 | 50·5 | Oram and Son | 19181 |
| 63·6 | + 2·0 | 39·0 — 55·2 | 48 3 | 28·2 | 11·7 | 48·3 — 89·4 | 51·6 | Webster | 15083 |
| 93·7 | + 19·6 | 49·3 — 59.0 | 53·8 | 22·3 | 15·6 | 53·8 — 89·8 | 53·5 | Pyott | 878 |
| 45·2 | + 18·6 | 64·1 — 71·8 | 68·3 | 29·1 | 13·1 | 94·3 — 58·0 | 55·3 | Mercer | 4827 |
| 47·6 | + 17·6 | 50·0 — 57·2 | 52·9 | 28·4 | 18·0 | 53·8 — 89·8 | 64·4 | David Reid | 850 |
| 93.7 | + 36.5 | 60·3 — 66·5 | 63·6 | 31·6 | 18·3 | 94·3 — 58·0 | 68·2 | Oram and Son | 19107 |
| 47·6 | + 17·8 | 64·1 — 71·8 | 68·3 | 28·2 | 20·3 | 48·3 — 89·4 | 68·8 | Klean and Co. | 1006 |
| 89·4 | + 12·3 | 54·9 — 61·9 | 58·0 | 27·3 | 21·5 | 94·3 — 58·0 | 70·3 | C. Frodsham and Co. | 3600 |
| 45·2 | + 17·7 | 92.0 — 96.0 | 94·3 | 30·7 | 23·6 | 48·3 — 89·4 | 77·9 | James Poole and Co. | 5801 |
| 89·4 | + 25.9 | 60·3 — 66·5 | 63·6 | 33·7 | 29·6 | 48·3 — 89·4 | 92·9 | Schoof | 6059 |

The Chronometers are placed in order of merit, their respective positions being determined by consideration of the irregularities of rate exhibited in the Table above.

## Casket for Lord Magheramorne.

THE elevation of Sir James Macnaghten Hogg, M.P., to the Peerage, has led his friends in Truro—which city he represented in Parliament for many years—to offer him an address of congratulation enclosed in a very special and artistic casket, which has been manufactured by Messrs. T. & J. Bragg, of Birmingham. The commission was given to Mr. Veen, of Truro, and the oak which forms the body of the box is a part of the timber taken from the old church on the partial adaptation of it to the first portion of the new Cathedral, which was consecrated last week. Upon the oak box are a series of panels and divisions in silver-gilt and enamel, so that the oak, appearing only at intervals, affords a very effective contrast. A richly moulded and decorated plinth supports the oblong casket, the obverse of which displays the enamelled arms of the city, with miner and mariner supporters. the civic power being indicated on another division by the enwreathed mace, a trophy of Neptune's trident dolphins and sea-weed forming a third. One end is illustrated with the enamelled shield of the diocese of Truro; on the opposite an Unionist trophy, also in colours, with crown over. The fourth side has the inscription plate. The lid is appropriately decorated in *repoussée* panels, while a richly wrought seroll handle has the emblazoned arms of his lordship in front, with monogram on reverse and the crest surmounting all. The finish is of the highest class, and every detail carefully rendered.

## Goldsmiths and Jewellers' Asylum.

THE twenty-first annual dinner of the Goldsmiths and Jewellers' Annuity and Asylum Institution was held, on October 31, at the Holborn Restaurant. Major George Lambert, F.S.A., the president of the institution and Prime Warden of the Goldsmiths' Co., occupied the chair, and was supported by, among others, Mr. E. J. Watherston, Mr. J. B. Ball, the Rev. J. H. Rose (Vicar of Clerkenwell), Mr. Churchwarden Spiers, Mr. Hagon, Mr. Taylor, Mr. F. B. Thomas, Mr. Under-Sheriff Rose-Innes, Mr. J. Mortimer Hunt, Mr. J. Wellby, Mr. D. Wellby, Mr. R. H. Secker, Mr. Henry Summers and Mr. J. L. Innocent (Secretary).

The Chairman, in proposing the toast, "Prosperity to the Goldsmiths and Jewellers' Annuity and Asylum Institution," said the institution was founded as far back as 1827 for the relief of everyone in connection with the goldsmiths' trade who was really in need of assistance, and it had continued to carry out that object with a liberal hand. It had met with a good deal of support, but nothing like the amount it deserved. In times gone by it had done a vast amount of good, and would continue to do good, but it was to be hoped that it would be more liberally supported. The way the affairs were managed were as perfect and inexpensive as it was possible to conceive. Indeed, it was managed free of expense if they excluded the small amount paid to their collector. Many institutions established in later years had been glad to adopt their rules, a fact that showed what a great amount of care was bestowed upon them by the promoters. He knew of no institution that was carried on upon better principles and with better results. There were, however, many large firms, some of whose workmen had been assisted by the society, who did not contribute at all to the funds. This ought not to be, and he hoped when they met again next year there would be no ground for complaint on that score. Their funds were not small, it was true, but the calls upon them increased from year to year, and consequently increased subscriptions were necessary.

Mr. E. J. Watherston said it was pretty well known that he was very much in favour of a reform of the City Guilds, but he was not, and never had been, in favour of any reform which would sweep them away altogether. On the contrary, he believed there was a grand future before them; that they had passed through the bad time of their existence, and were about to become of great use and service to London. Some of the Guilds had already done much to promote technical education, and this was a matter in which they could—and he believed would—do very much more.

The Chairman said the Goldsmiths' Co.—of which he had the great honour of being the Prime Warden, after having begun life as an apprentice—were by no means an idle body. They were very busy at the present time, but in spite of the temptation held out to him in Mr. Watherston's speech, he was not at liberty to say what it was they were doing.

Mr. J. Mortimer Hunt gave the toast of "The Executive of the Institution."

Mr. F. B. Thomas replied, and said it was very satisfactory to find that the funded property of the institution continued to increase. The fact that 1,200 workmen were members of the institution was a splendid evidence of its great usefulness to members of the trade.

Before the close of the evening the Secretary announced subscriptions in connection with the dinner amounting to about £320, including £105 given by the chairman, and £20, the result of a workshop collection.

Christmas and New Year's Presents.—The following notice has been issued by the Post Office:—Senders of parcels desirous of availing themselves of the facilities offered by the Foreign and Colonial Parcels' Post to despatch Christmas and New Year's presents to relatives and friends abroad are reminded that, in order that parcels should reach their destination on or about the desired date, such parcels, more especially those addressed to the Colonies, must be posted some time in advance. The following are the latest dates when parcels can be forwarded so as, in due course, to reach their destination about Christmas or New Year, as the case may be:—For the Continent of Europe: Not less than from three to ten days before Christmas Day or New Year's Day, according to the locality; for British Colonies and Possessions and Egypt: The first date to reach about Christmas Day, the second to reach about New Year's Day; Cape Town (other towns in the Cape Colony will, of course, receive the parcels later): December 1, December 8; Natal: November 24, December 1; Ascension and St. Helena: December 1, December 8; West Indies (Antigua, Barbadoes, British Guiana, Dominica, Grenada, Jamaica, Montserrat, Nevis, St. Kitt's, St. Lucia, St. Vincent, Tobago, Tortola, Trinidad): December 1, December 15; Gibraltar, Tangier and Malta: December 14, December 21; Cyprus: November 30, December 7; Egypt: December 7, December 14; Aden: November 30, December 7; India (Bombay): November 23, November 30; Ceylon: November 16, November 30; Straits Settlements, Labuan and North Borneo: November 16, November 30; Hong Kong: November 2, November 16; South Australia, Victoria, New South Wales and Tasmania: November 3, November 10; Western Australia: November 10, November 17; Dominion of Canada (New Brunswick, Nova Scotia, Prince Edward Island, Province of Ontario): December 8, December 15; North-West Territories, Province of Manitoba, British Columbia, Vancouver's Island: December 1, December 8; Newfoundland: December 6, December 20. With the exception of the Dominion of Canada and Newfoundland, the dates given are those on which the mails are made up in London; in the case of Canada and Newfoundland the mails are made up at Liverpool. In order to be included in the mails despatched as above mentioned, parcels must be posted in time to reach London or Liverpool, as the case may be, by the night mails preceding the day of despatch, and, to prevent disappointment, care should be taken to make inquiry in good time at the local post offices. On almost every occasion of the despatch of a parcel mail abroad, parcels reach the despatching office too late to be included in the outgoing mail, although obviously intended to go by such mail, and more or less delay is necessarily the consequence. In these cases the parcels have been posted by the senders on the days appointed for the closing of the mail or for the departure of the steamer, and the parcels consequently reach the despatching office too late to be forwarded.

## Localities of Gems.

THERE is no law, according to Burnham, regulating the geographical distribution of mineral species, as is the case with plants and animals, hence climate has little or no influence upon their development; yet it is a fact that the richest coloured gems are found in tropical regions. They occur in different geographical formations, but the most valuable are found in the oldest. Sometimes they are embedded in a mass of rock; at other times they are near the surface, in diluvial or alluvial soil, gravels, and sands of river beds (where they are seen as river pebbles); and not unfrequently do they appear in derivature rocks, far from their original home.

They are most abundant in warm countries, and from this circumstance it has been thought that volcanic agency may have had some influence in producing them. It would seem that some peculiar conditions in the laboratory of Nature must have been required for the production of these, her choicest gifts. Some of the southern countries of the eastern continent yield the finest and the largest quantities of the most valuable gems—the ruby, sapphire, topaz, spinel, jacinth and other coloured stones. How can this be accounted for, except on the ground that climate has to some extent a controlling effect upon the formation of precious stones, though it cannot be the only influence, since they occur, in some of their species, in nearly every country on the globe?

North Carolina, in the New World, is probably the richest State in the American Union for its gem minerals, many of which are of the first class. A few specimens of the diamond, of small size but excellent quality, have been discovered in six different counties in this State.

California offers a considerable variety of ornamental stones, including the diamond, corundum opal, garnets, various kinds of the quartz species, malachite, azurite, selenite and absidian.

## Gazette.

### Partnerships Dissolved.

Schultis, Schwar & Co., Goswell Road, E.C., and Pretoria, South Africa. Johnson & White, Red Lion Street, Clerkenwell, electro-plate manufacturers. Castle & Turton and D. Miller & Son, Sheffield, cutlery manufacturers. Wright Brothers & Shires, Doncaster, pawnbrokers. Bentley, Powis & Co., Hanley, jet ware manufacturers. Stacey Bros., Sheffield, cutlery manufacturers. Charles Jones & Co., Liverpool, jewellers. Herz, Smalz et Cie, and Herz, Rosenfeld and Co., Paris, and St. Andrew Street, Holborn Viaduct, diamond merchants, so far as regards C. Smalz. L. Courlander & Co., Kimberley, South Africa, merchants.

### THE BANKRUPTCY ACT, 1883.

#### Receiving Orders.

*To surrender in London.*—George Warwick, Poland Street, Oxford Street, goldsmith.

*To surrender in the Country.*—Walter Teale Densham, Bude, Cornwall, jeweller. Owen Allen, Bath, watchmaker. Samuel Bradley (trading as John Payne), Blackpool, jeweller. Thomas Swaine, Macclesfield, watchmaker. Walter Green, Birmingham, manufacturing jeweller. George Handsom, Bedale, Yorks, jeweller. James Bate, York, watchmaker. John Britton, Nottingham, watchmaker. Henry Harris (trading as Henry Harris & Co.), Edgbaston, jewellers' factor. William Frederick Sanders, Staines, clockmaker, Thomas Lucas, Quorndon, Leicestershire, watchmaker. William Dyer, Birmingham, jeweller. James Smith, Cheltenham, jeweller.

#### Public Examinations.

*In London.*—W. Jardine (trading as Jardine & Co.), Great Winchester Street, diamond merchant; December 16, at 12.30.

*In the Country.*—J. Britton, Nottingham, watchmaker; December 6, at 10. J. L. Ward, Jun., the Globe Spoon Works, Smethwick, spoon manufacturer; December 12, at 11. S. Bradley (trading as John Payne), Birmingham and Blackpool, jeweller; December 22, at 2. W. Green, Birmingham, jeweller; December 22, at 2. J. Smith, Cheltenham, jeweller; December 22, at 12. T. Lucas, Quorndon, watchmaker; December 14, at 10.

#### Adjudications.

*In the Country.*—O. Allen, Bath, watchmaker. J. Bate, York, watchmaker. T. Swaine, Macclesfield, watchmaker. G. Handsom, Bedale, jeweller. W. T. Densham, Bude, jeweller. J. L. Ward, Jun., Smethwick, spoon manufacturer. W. Dyer, Birmingham, jeweller. J. Smith, Cheltenham, jeweller. W. F. Sanders, Staines, clockmaker.

#### Notices of Dividends.

*In London.*—E. Bassett, High Street, Camden Town, pawnbroker; 3¼d., second and final; any day except Saturday, Chief Official Receiver, 33, Carey Street. T. W. Cooper and A. Cooper (trading as Thomas W. Cooper & Son), Amwell Street, Clerkenwell, watch manufacturers; 5¼d., second and final; any day except Saturday, Chief Official Receiver, 33, Carey Street, T. W. Cooper (separate estate), Amwell Street, Clerkenwell, watch manufacturer; 11s. 3d., first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street. A. Cooper (separate estate), watch manufacturer; 2s. 4d., first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street.

*In the Country.*—W. J. Anderson, Carnforth, watchmaker; 1½d., third and final; any Wednesday between 12 and 2, Seear, Hasluck & Co., 23, Holborn Viaduct, E.C. W. Rawlin, Newark-upon-Trent, watchmaker; 7½d., first; any Monday, Official Receiver, Nottingham. W. S. Wigg, Great Yarmouth, jeweller; 8s. 0¼d., first and final; November 29, H. P. Gould, Norwich.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

14,449. J. A. Lund, London, for "Improvements in the striking apparatus of clocks." Dated October 24, 1887.

14,451. T. Elford, G. Ackland and R. Morgan, London, for "Improvements in calcining and melting copper, lead, and other ores and regulus." Dated October 24, 1887.

14,482. E. B. Smith, a communication from James Brown, New Zealand, for "Improved construction or arrangement of surfaces for separating gold or other fine metal particles from quartz or earthy matters." Dated October 25, 1887.

14,609. H. T. B. Dumelow, London, for "Improvements in solitaires and studs." Dated October 26, 1887.

14,647. H. H. Lake, a communication from Adalmar Breden, Austria, for "Improvements relating to the electro-deposition of silver and nickel upon iron, steel and other metals." Dated October 27, 1887.

14,697. I. J. T. Newsome, London, for "Improvements in keyless and key-winding watches." Dated October 28, 1887.

14,792. H. J. Allison, a communication from James Bowyer D'Arcy Boulton, United States, for "Improvements in process for casting metallic ingots." (Complete specification.) Dated October 31, 1887.

14,904. C. W. Kitto, London, for "An improved apparatus for distributing, mixing, separating, grinding, cleaning and amalgamating gold or other ores or tailings." Dated November 2, 1887.

15,165. F. D. Dencker, London, for "Improvements in chronometers." Dated November 7, 1887.

15,223. H. Barrett, London, for "An improved method of mounting coins, stones, compasses, &c. (or an improved mount for coins, &c.)." Dated November 8, 1887.

15,334. J. F. Cassidy, Birmingham, for "A safety centre pinion for going-barrel watches; can be applied to clocks, musical boxes and all going-barrel machines." Dated November 10, 1887.

15,504. A. N. Contarini, London, for "Improvemeuts in the process of separating precious metals from their ores, and in apparatus to be employed therein." Dated November 12, 1887.

15,561. H. Ostermann and A. Prip, London, for "Improvements in the manufacture of balance wheels for watches and chronometers." Dated November 14, 1887.

15,574. C. T. J. Vautin, London, for "Improvements in apparatus for the extraction of gold from crushed or other finely-divided auriferous material." (Complete specification.) Dated November 14, 1887.

15,638. W. Hardy, jun., London, for "Improvements in regulating watches." Dated November 15, 1887.

15,660. A. J. Thomas, London, for "Improvements in electric clocks." Dated November 15, 1887.

15,767. L. P. Guignard, London, for "Winding-up indicator for watches, clocks and horological works of any kind with going-barrel." Dated November 17, 1887.

15,849. L. Weill and H. Harburg, London, for "A combination of a watch, sovereign purse, stamp case and match box." Dated November 18, 1887.

15,866. E. Weis, London, for "Imitation jewellery and ornaments." Dated November 18, 1887.

15,881. C. A. Meygret and P. Marino, London, for "A new alloy and process for manufacturing the same, and for electro-plating or typing therewith." Dated November 18, 1887.

## Recent American Patents.

| | | |
|---|---|---|
| Chamois Skin with Rouge, Impregnating. | Darby & Blakeslee | 372,207 |
| Chuck for Watch Movement Plates. | C. V. Woerd ... ... | 372,002 |
| Clock, Astronomical. | H. Conant ... ... ... ... ... | 371,306 |
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A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

# Correspondence.

*All Letters for Publication to be addressed to the* EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *7, St. Paul's Churchyard, E.C.*
*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

### TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

SIR,—Many articles have appeared in the daily papers lately on the subject of diamond production and diamond cutting. The person who writes these articles can know little about the subject, and by misleading the public, does a great amount of injury when he tells them that six-and-a-half tons of rough diamonds were taken out of the mines in six years. Although this statement may be correct, the writer does not seem to know of what these six-and-a-half tons are composed. That absence of knowledge may frighten the owners of diamonds, especially private people. Some ladies hold as much as £20,000 worth of diamond jewellery, and the above statement is likely to give them a wrong impression as to the real value of their possessions. But let us look at the facts by experience. Now, three parts of this six-and-a-half tons which were taken out of the mines are nothing but what we term in the diamond trade "common boart"—valued at 2s. 6d. per carat—a class of diamond used to make powder for polishing other diamonds; it is also used by engineers for electrical purposes, and for many other uses. Now there are one-and-a-half tons to be accounted for; of this weight a large proportion is too common to cut profitably. The next quality is cut in large quantities and held by rich diamond merchants, or, as soon as possible, distributed over the whole world. Now comes the fine quality, white and perfect. This class is dearer at this time than it has been since the discovery of the South African mines. Rough stones, that will produce from one to three carat brilliants when cut, cost, in the rough, from £5 to £12 per carat, and they lose two-thirds of their weight in cutting to make them of fine proportion and shape. We have had rough diamonds sent us to cut and polish lately, estimated at £50 per carat, showing the scarcity of fine rough diamonds even in the trade. It is now certain that the rough material must have a great rise in price, on account of the mining companies amalgamating with a gross capital of about £14,000,000 sterling. When this amalgamation takes place the great company will corner the market; they will be able to regulate the output of rough to suit the demand, and keep prices even higher than at the present time.

By inserting this in your valuable Journal you will do a justice both to diamond merchants and wearers of diamond jewellery. We will take the liberty of sending you an article on diamond cutting for your next issue, to prevent the public being deluded by inexperienced theorists.

Yours truly,
FORD & WRIGHT.

Clerkenwell Road, and
18 and 19, Clerkenwell Green,
*November* 21, 1887.

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DEAR SIR,—Perhaps some kind reader of your Journal would explain the best method for extracting broken cylinder plugs from very small cylinders.

I find it a difficult task when the plug is very tight, and it generally involves putting a new cylinder altogether, which one has not always by him, therefore causing a considerable loss of time. The only tool I should imagine suitable is a hardened steel stake, having a varying size of gradual bevelled chamfored poles.

Do watch-tool manufacturers keep tools of this description? If they do, I should like to know where to obtain one. Could you enlighten me on this subject, you would greatly oblige

ANXIOUS BRIGHTON.

# Buyers' Guide.

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

VOL. XIII.—No. 7.] JANUARY 2, 1888. [Subscription, 5s. per Annum. { Post Free.

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## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to

THE WATCHMAKER, JEWELLER & SILVERSMITH,
7, ST. PAUL'S CHURCHYARD,
LONDON, E.C.

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

ANOTHER year has passed and gone, and by the time the present number of the journal is in the hands of our readers, the New Year will have been ushered in with all the honours.

To state that the events of the past twelve months have been of very great moment to the trades with which we are especially concerned, would be merely to utter a truism with which everyone is acquainted. Whether they are to operate beneficially or otherwise in the future is a matter of speculation.

Still, speculation is better than apathy; it is a healthy sign in itself, indicative of a nervous awakening and prospective action, and that it exists at present to a greater extent than has been the case for a great number of years is an undoubted fact, as it is a matter for congratulation.

The business outlook for the next year is far from being so cheerless as it was this time twelve months back. On all sides we see signs of activity and preparation, and while the general trade of the country shows an improved tendency, the special causes which produced local depressions are either removed or are disappearing.

Thus, the dulness in the watch trade during the latter portion of the year has undoubtedly been chiefly due to the uncertainty prevailing as to the probable effect of the special clauses of the Merchandise Marks Act affecting that trade, which, coupled with the delay attending the publication of the Order in Council with respect to the Hall-marking of cases, has prevented retail buyers from adding to their stocks; while, with a decrease in the number of names appearing under "Receiving Orders" in the *Gazette*, a marked improvement is observable in the jewellery and fancy trades, in which confidence had been previously so much shaken as to seriously interfere with business.

With regard to the first-named trade, efforts are everywhere apparent of a desire to comply with the requirements of the law, and, as it has been almost officially announced that the Act was intended to operate more as a deterrent measure than to be used as a means of punishment, not much inconvenience need be

apprehended from its application by those who only desire to act honestly. The foregoing remarks may, to some extent, apply to the construction to be placed upon the retrospective character of the measure, although, in the absence of any authoritative decision on the subject, it would not be safe to assume that all watches stamped before the publication of the Order in Council will not require any further distinctive marks.

## General Notes.

THOSE who are interested in or contemplate speculating in gold mining shares should read a paper on "The Goldfields of the Transvaal," contributed to last month's *Longmans' Magazine*, by George J. Nathan.

The Queen has received a magnificent Jubilee present from the diamond fields of South Africa in the shape of an ivory casket lined with curled ostrich feathers. The lid is mounted with gold filigree-work and profusely studded with diamonds.

The death took place last month of Mr. Samuel Roberts, of Sheffield, aged 87 years. Mr. Roberts was descended from an ancient Yorkshire family which took a leading part in the introduction of the silver-plating industry into Sheffield. He gave munificently to church, educational, and social objects.

The death took place last month of Mr. George Garritt, of Smith Street, Northampton Square. The deceased gentleman, who was well known and respected in connection with many parochial and trade associations, has held the positions of Chairman of the Goldsmiths' & Jewellers' Annuity Asylum and Secretary to the Precious Metals Dealers' Protection Society.

Orders have been issued to the Customs officials of the United Kingdom to lay an embargo on all watches bearing the English Hall-mark in the case, imported after the present date, unless the place of origin be distinctly marked on the movement, pending further action under the Merchandise Marks Act with a view to their confiscation, &c.

One of our Coventry friends informs us that the dulness of trade is by no means over as regards the watchmaking industry in that town; as a proof of which he adduces the fact of lever escapements being now made at 1s. 9d. This is indeed a poor look-out for the workmen engaged, and the effects of depression could, we think, hardly go much farther in that direction.

It is perhaps not very generally known that the mechanical figures, &c., of many of the old musical clocks known as twelve-tuned Dutchmen, made by Rimbault, who kept a shop in Great St. Andrew's Street, Seven Dials, about the middle of last century, were painted by the afterwards celebrated dramatic portrait painter, Johann Zoffany. It was through Rimbault, who introduced him to Benjamin Wilson, that he became known to David Garrick, the actor, who subsequently became his warm friend and patron.

In *Some Official Correspondence of George Canning*, edited by Edward J. Stapleton, and published by Messrs. Longmans, Green & Co., we find a curious petition from the watchmakers of London, begging that Mr. Canning will encourage their trade by substituting watches for snuff boxes as diplomatic presents to foreigners. The petition incidentally mentions that the cost of "the best gold repeater that could be required" would not exceed 100 guineas. Canning answers that the subject is entirely new to him, and that he will take it into his consideration. The "correspondence" covers Canning's last term of office, from 1821 to 1827.

The prospectus of the British Diamond-cutting Co., Limited (R. E. North & Co.) states that the proposed capital is £100,000, in £1 shares, but the present issue is to be £75,000, including the "fully paid" shares given to the vendors. It is an entire mistake, says the prospectus, to suppose that diamonds can be cut well and cheaply only in Holland. Messrs. North's business has been bought as a nucleus of a large experiment which is to prove this statement true.

Mr. Thomas Jessop, who died at Sheffield on November 30, was for many years proprietor of Brightside Steel Works, the largest works engaged exclusively in the manufacture of steel in the world, and was chairman of the limited company which took over the business. He was Mayor and Master Cutler, and founded and furnished Jessop's Hospital for Women, costing £30,000. Mr. Jessop was 84 years of age.

The death of Professor Stewart, of Owens College, Manchester, took place last month at his house near Drogheda. He held for about ten years the directorship of the Kew Observatory. At the time of his death he was president of the Physical Society of London and of the Manchester Literary and Philosophical Society. In 1870 he was appointed Professor of Physics at Owens College, and director of the Physical Laboratory.

A man, who declined to give any account of himself, was arrested last month at Birmingham, on suspicion of being concerned in some jewellery robbery. A "dress improver" containing new jewellery worth about £200 was accidentally left at an hotel in the town on Friday by a woman who had been staying there along with the prisoner and another man, and the prisoner was arrested on calling to claim the valuables, which bore upon them shopkeepers' price tickets.

In reply to the inquiry of a correspondent as to how the Merchandise Marks Act will affect stocks of watches purchased before the new law came into operation, Mr. Courtenay Boyle states, on behalf of the Board of Trade, that they have no power to place an authoritative opinion upon an Act of Parliament, but that they may call attention to the exempting words in Section 7 of the Act—"and the watch bears no description of the country where it was made."

Mr. Lowinski, diamond expert, having made an examination of some newly-purchased ground in Purtyal, India, on behalf of the Hyderabad Company, reports the discovery in the plot of a rich diamond mine. He states that the ground contains millions of tons of diamondiferous layers which have never been touched, and that the finding of diamonds in largely-paying quantities is only a matter of time and labour. As the Company was to have commenced work within a month from the time of his report, it is doubtless by this time carrying on operations.

In an interview with a representative of the *Coventry Herald* a leading manufacturer stated that the depression in the watch trade of Coventry was partly due to the transition state of the type of watch produced, but that the same genius which enabled Coventry to take the trade from Liverpool and London will enable it to win back on new lines the old supremacy. He had a distinct hope for the future of the Coventry watch trade. Gauged by the progress in the article produced, Coventry's advance, during the past five years, is greater than that of either Switzerland or America; and should that be continued, a new future for Coventry, based on the new type of watch—the keyless and going-barrel—the improved method of manufacture, and the highly-organised factory system, may fairly be predicted. He was emphatically of opinion that, though prices had gone down, the quality of Coventry watches had improved; the type of goods produced was certainly more in touch with modern demands, and time was on the side of local trade.

The representative of the Macdonald Ranges Ruby Mining Co. has received a very favourable report upon the gems which he has brought to this country from the Central Territory of Australia. It is drawn up by a well-known firm of expert brokers in Hatton Garden, who state that they have come to the conclusion that the Co. has made a valuable discovery, and possess "stones which will sell freely at high prices." The report further states that a large quantity of these stones have been cut and are gradually being introduced to the London market, and there is no doubt in time they will command a ready sale, for many of them are of extreme beauty. It is worth notice that experts both in Melbourne and Adelaide laughed the "find" to scorn, holding out the hope that some of the rubies might be garnets.

The Centennial International Exhibition at Melbourne in 1888 is being actively supported by the various Chambers of Commerce on this side, some of which are using their influence with a view to British industry being adequately represented at Melbourne. The Council of the London Chamber has had under consideration letters received from the Royal Commission for the Exhibition in this country, reminding it of the keenness of foreign competition with British trade in Australia, and the importance, therefore, of British commercial interests being well represented. The same letters were brought before the Australasian Trade Section of the Chamber at a special meeting held the other day, when it transpired that previous efforts made by the Chamber had had good effect, the Association of Chambers of Commerce of the United Kingdom having been induced to issue a circular in favour of the Exhibition. Sir Vincent B. Kennett-Barrington, a member of the Council of the London Chamber, who has just returned to England, was stated to have rendered valuable service in inducing foreign states to take part in the Exhibition. Some discussion took place as to the unsatisfactory treatment of exhibitors at the recent Adelaide Exhibition, more especially in regard to an alteration of the tariff which it was alleged was applied to goods sent to Adelaide for sale, on the understanding that they could be disposed of on payment of the duties in force when they were originally received. The system of awards was also stated to be unsatisfactory. The hope was therefore expressed that no changes of this kind would be made in the course of the Melbourne Exhibition. One or two members interested in Victorian trade were of opinion that this was extremely unlikely, and, in support of this, attention was drawn to the prospectus of the Exhibition.

The Diamond Market.—Although the latest reports from *America* state that brisk sales are the order of the day, none of the Continental markets are as yet affected thereby. However, the holidays are considered sufficient to account for the present dulness, and a lively Spring trade is confidently anticipated. Probably, to the same cause is attributable the scarcity of buyers in the *London* market, which, coupled with the high quotations from the fields, makes things very flat.

Latest from *Kimberley* report the prices firm for all classes of goods, with a less active demand.

Silver.—The fluctuations, which are a distinguishing feature of this market, owing to the varying rates of the Indian exchanges, followed a slightly upward tendency throughout the last month; quotations for bars closing at 44½d. per oz., while Mexican dollars remain nominally at 43¾d.

City and Guilds of London Institute.—Dr. A. K. Miller will deliver a course of ten lectures on the "Chemistry of Oils and Fats," at the Central Institution, Exhibition Road, on Mondays, at 4 p.m., during the Spring term, commencing on January 23, 1888. The lecturer will treat of—1. Oils of mineral origin; petroleum, including shale oil, paraffin, and manufacture of oil gas; 2. Oils, fats, &c., of vegetable and animal origin, volatile oils, including turpentine, fixed oils and fat,

## Trade Notes.

The Prince of Wales has ordered a set of Harrison's Patent Tube Chimes (which we spoke of in connection with the Manchester Exhibition and elsewhere) for the church of St. Alban's, Copenhagen, and Mr. Harrison has gone over to superintend their fixture.

The decoration and diploma of the Legion of Honour have been awarded by the French Government to Mr. James Kendal, of the firm of Kendal & Dent, watchmakers, 106, Cheapside, London. This firm was also fortunate in receiving the Gold Medal at the Paris Exhibition.

Jobbers should write to Messrs. A. Flavell & Co., 59, Spon End, Coventry, for their new price list of materials and parts used in watch repairing. The prices quoted for the various repairs appear to us extremely low, while the well-known reputation of the firm is a sufficient guarantee of the quality of the work.

We are informed by Mr. James Rigg, the well-known manufacturer of technical education apparatus, that his business has been taken over by a company, under the style of Rigg's Technical Education Appliances, Limited. The new offices and showrooms are at 20, Bucklersbury, Queen Victoria Street, E.C.

Messrs. Thompson & Vine have dissolved partnership. Mr. E. J. Thompson, whose long and active business and public career has well merited a much needed rest, having retired, the business will in future be carried on by his nephew, Mr. T. W. Vine, who has long been the active partner.

The *New Romney Household Almanack*, which has now reached its fifth year of publication, is interesting as being the only work of its kind we know of that owes its being to the enterprise of one of our craft. It is published by Mr. J. N. Masters, jeweller, of Rye and Romney, and, judging from the number of advertisements which appear in it, is well appreciated by local patrons. The present number is well got up, and contains a large amount of local and general information.

Another Almanack that is deserving of a word of praise is the publication of Messrs. P. & A. Guye, of 77, Farringdon Road, E.C. It contains, besides many memoranda likely to be of interest to watchmakers, useful monthly notes, and an appendix comprising the firm's new price list and telegraphic code.

Mr. J. W. King, of 13, St. John's Square, Clerkenwell, celebrated the anniversary of his new plating and gilding works by lighting the premises by the electric light. His plant for lighting and for plating and gilding purposes consists of three dynamos, the largest being an Edison machine of one-and-a-half tons' weight, and several sets of accumulators; the motive power being an Atkinson gas engine. The whole installation, which is no doubt, the most complete in Clerkenwell, has been erected by Mr. King and his own workmen, assisted by his son, who is a pupil to a firm of electrical engineers. Mr. King gained a further certificate in electro-metallurgy at the last May examination of the City Guilds.

A Novelty in Post Cards.—A novel post card has been patented by Mr. William Evans, of Rowley Park, Stafford. This invention embodies a method for dispensing with publicity of names and addresses of senders of post cards by the substitution of indexes, which are letters or numbers or letters and numbers combined. The index on any post card represents the sender, and corresponds with a similar one in possession of the addressee, and so refers him to the name and address of the sender. The invention doubtless would cause a certain saving of time and obviate unnecessary formalities in simple business communications of "Sir" or "Dear Sir," "Yours obediently" or "Yours truly," and such like (besides the non-publicity of name and address of sender), all of which may be taken for granted under the index,

# The Merchandise Marks Act.

CUSTOMS REGULATIONS.

PROHIBITION ON IMPORTATION.

From the *London Gazette*, December 2, 1887.

1. Goods prohibited to be imported as hereinbefore recited,* having applied to them forged trade marks, false trade descriptions, or marks, names, or descriptions, otherwise illegal, which, upon examination, are detected by the officers of Customs, are to be detained by them without the requirement of previous information.

2. In giving information with a view to detention, an informant must fulfil the following conditions, viz.: (i.) He must give to the Collector or Superintendent, or the Chief Officer of Customs of the Port (or Sub-Port) of expected importation, notice in writing, stating the number of packages expected, as far as he is able to state the same; the description of the goods by marks or other particulars sufficient for their identification; the name or other sufficient indication of the importing ship; the manner in which the goods infringe the Act; the expected day of the arrival of the ship. (ii.) He must deposit with the Collector or other officer, as aforesaid, a sum sufficient, in the opinion of that officer, to cover any additional expense which may be incurred in the examination required by reason of his notice.

3. If, upon arrival and examination of the goods, the officer of Customs is satisfied that there is no ground for their detention, they will be delivered. If he is not so satisfied, he will decide either to detain the goods, as in a case of detention upon ordinary examination, or to require security from the informant for reimbursing the Commissioners or their officers all expenses and damages incurred in respect of the detention made on his information, and of any proceedings consequent thereon.

4. The security thus required must be an immediate *ad valorem* deposit of £10 per cent. on the value of the goods, as fixed by the officer from the quantities or value shown by the entry; and, also, subsequently a bond to be completed within four days in double the value of the goods with two approved sureties. The *ad valorem* deposit will be returned upon completion of the bond, and will not be required if, as an alternative where time permits, the informant prefers to give a like bond before examination, upon estimated value of the goods declared to by him under statutory declaration. If the security is not duly given as above required, there will be no further detention of the goods.

5. In the above regulations the words "officer of Customs" mean an officer acting under general or special direction of the Commissioners, and the words "value of the goods" mean value irrespective of duty.

6. The "notice" and "bond" required as above shall be in the forms contained in the schedule to regulations, or in such other forms as the Commissioners may from time to time order and direct.

7. The security taken under these regulations will be given up at the times following—that is to say: Where given before examination, and if no detention, forthwith; where given on detention—if the forfeiture is completed, either by lapse of time or ultimate condemnation by a Court of Justice, then on such completion of forfeiture; if the forfeiture is not completed, then if the goods are released by the Commissioners, and no action of suit has been commenced against them, or any of their officers in respect of the detention, then at the expiration of three months from the time of detention; or, if the goods are released for failure of proceedings taken for the forfeiture and condemnation thereof upon information under Section 207 of the Customs Consolidation Act, 1876, and no action or suit has been commenced against the Commissioners, or any of their officers, in respect of the detention, then at the expiration of three months from the trial of such information; if within such periods as aforesaid any such action or suit as aforesaid has been commenced, then upon the ultimate conclusion of such action or suit, and the fulfilment of the purpose for which the security was given.

8. These regulations apply to trans-shipment and transit goods as well as to goods landed to be warehoused or for home consumption.

9. The 1st day of January, 1888, is, by these "regulations," fixed as the day from which Section 2 of the Revenue Act, 1883,

* See Section 16, Merchandise Marks Act.

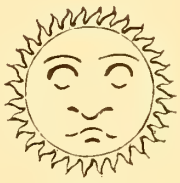
FIGURE I.

Shield for Foreign Gold Case. (Actual size.)

FIGURE II.

Shield for Foreign Silver Case. (Actual size.)

FIGURE III.—Particular Mark for each Hall.



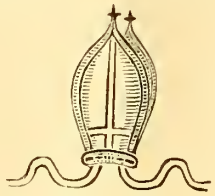
LONDON.
(Phœbus.)

BIRMINGHAM.
(Equilateral Triangle.)

CHESTER.
(Acorn and Two Leaves.)

SHEFFIELD.
(Crossed Arrows.)

EDINBURGH.
(St. Andrew's Cross.)



GLASGOW.
(Bishop's Mitre.)

DUBLIN.
(Shamrock.)

FIGURE IV.—Carat Marks for Gold.

| | | |
|---|---|---|
| 22, and ·917. | 18, and ·75. | 12, and ·5. |
| 20, and ·833. | 15, and ·625. | 9, and ·375. |

shall be repealed, subject to the terms of the recited Act; and these regulations will take effect from the date of such repeal.

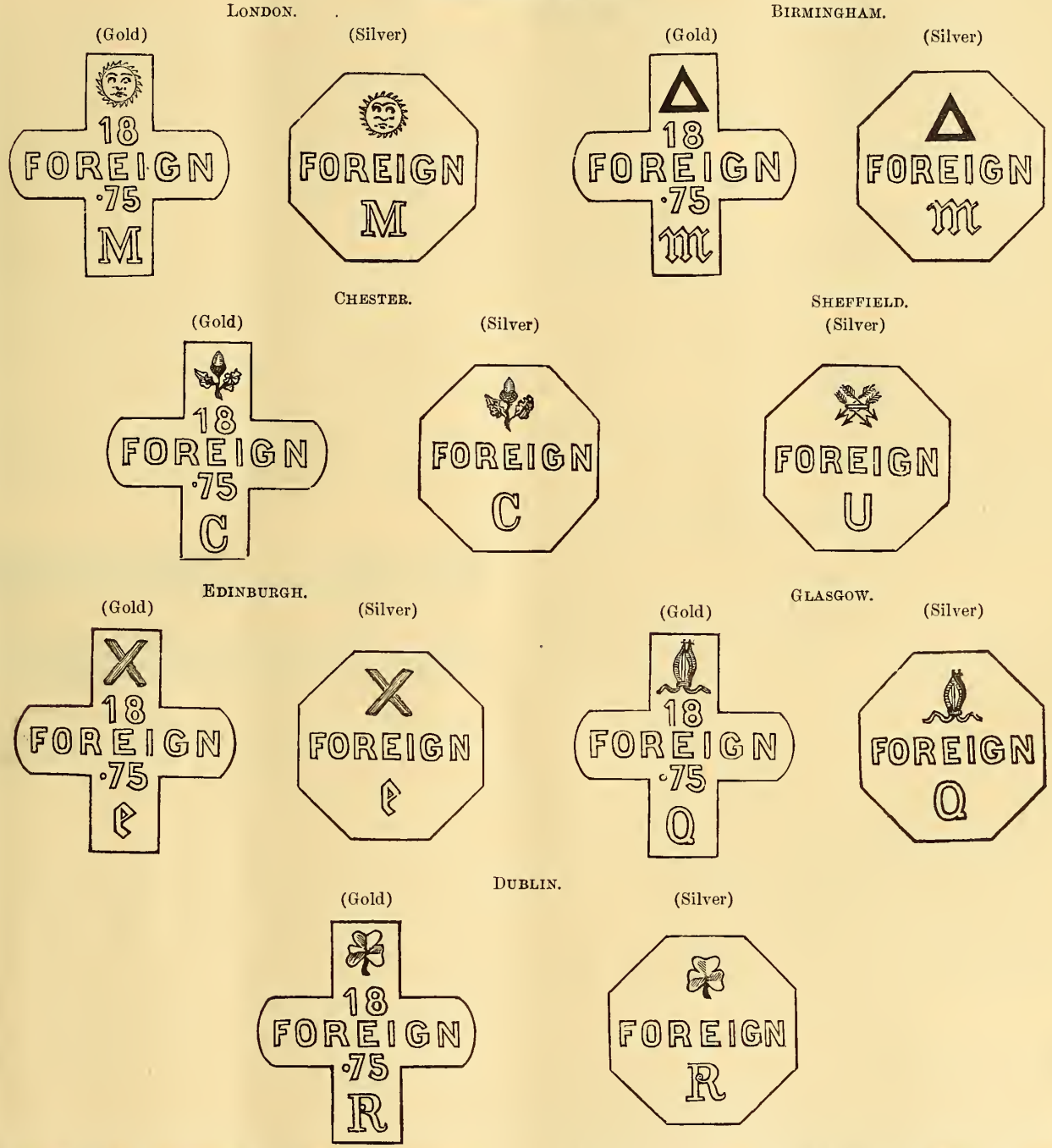
Commissioners of Her Majesty's Customs. { Charles Du Cane, H. Murray, Horace Seymour.

Custom House, London, *December* 1.

not, to any assay office in the United Kingdom for the purpose of being assayed, stamped, or marked, shall make a declaration declaring in what country or place the case was made. If it appears by such declaration that the watch case was made in some country or place out of the United Kingdom, the assay office shall place on the case such a mark (differing from the mark placed by the office on a watch case made in the United Kingdom) and in such a mode as may be from time to time directed by Order in Council.

(2.) The declaration may be made before an officer of an assay office appointed in that behalf by the office (which officer is hereby authorised to administer such a declaration) or before a Justice of the Peace or a Commissioner having power to administer oaths in the Supreme Court of

FIGURE V.—REPRESENTATION OF MARKS.
(Six times the actual size.)




The annual variable date-letter is to be inserted in position as shown above. The proper gold carat value is also to be inserted in position as shown above.

## Form of Declaration and the new Hall Marks for Foreign-Made Watch Cases.

From the *London Gazette*, December 9, 1887.

Whereas by the Merchandise Marks Act, 1887, 50 and 51 Vic. c. 28, it is, amongst other things, provided that—

(1.) Every person who, after the date fixed by Order in Council, sends or brings a watch case, whether imported or

Judicature in England or Ireland or in the Court of Session in Scotland, and shall be in such form as may be from time to time directed by Order in Council.

(3.) Every person who makes a false declaration for the purposes of this section shall be liable on conviction or indictment to the penalties of perjury, and, on summary conviction, to a fine not exceeding twenty pounds for each offence.

Now, therefore, Her Majesty, by and with the advice of Her Privy Council, and in exercise of the powers vested in Her by the above recited provisions of the said Act, is pleased to order and declare, and doth hereby order and declare, that where it appears by such declaration that such watch cases have been made in some country or place out of the United Kingdom, then the following Authorities, that is to say:—

The Wardens and Commonalty of the Mystery of Goldsmiths of the City of London;

The Guardians of the Standard of Wrought Plate, Birmingham;

The Company of Goldsmiths of the City of Chester;

The Guardians of the Standard of Wrought Plate, Sheffield;

The Incorporation of Goldsmiths of the City of Edinburgh;

The Goldsmiths Company of the City of Glasgow;

The Fraternity or Company of Goldsmiths of the City of Dublin;

shall respectively cause to be placed on such watch cases the marks more particularly described and delineated in Schedule II. hereunto annexed, and no other mark or marks, and such marks are hereby authorised accordingly.

And it is hereby further ordered and declared that the declaration to be made shall be in the form set forth in Schedule I. hereunto annexed.

This Order shall come into operation on the first day of January, one thousand eight hundred and eighty-eight.

C. L. Peel.

## SCHEDULE I.

Form of Declaration.

I (*a*) do hereby declare that the [watch case] *or* [watch cases] [brought] *or* [sent] by me this day to the Assay Office at in number and in a parcel marked [was] [were] made in (*b*)

Declared at this day of , 18 .

Before me (*c*)

Officer of the aforesaid Assay Office appointed in that behalf

*or*, Justice of the Peace for

*or*, Commissioner having power to administer oaths in the Supreme Court of Judicature in England

[Supreme Court of Judicature in Ireland]

[Court of Session in Scotland].

(*a*) Here insert name and address of declarant.
(*b*) Signature of declarant.
(*c*) Signature and title of person before whom the declaration is made.

## SCHEDULE II.

On a foreign gold case:—

Within a shield of the form of a Cross, and of the size shown in Figure I. of the Appendix hereto, the word "Foreign," over which a Hall mark particular to each office shown in Figure III. and the carat value of the gold, and under which the decimal equivalent of the carat value of the gold together with the variable annual date letter.

On a foreign silver case:—

Within a shield of the form of a regular octagon and of the size shown in Figure II. of the Appendix hereto, the word "Foreign," over which a Hall mark particular to each office shown in Figure III. and under which the variable annual date letter.

The particular Hall mark above referred to for each of the seven assay offices at which foreign cases may be stamped is shown in Figure V. of the Appendix hereto.

# Birmingham News.

From Our Correspondent.

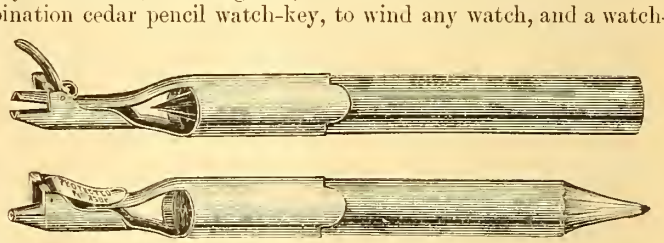
DECEMBER has proved a rather flat month as far as business among the Birmingham jewellers is concerned. The usual rush before the Christmas holidays has not come with anything like the usual pressure, and most manufacturers have been hoping for the New Year, 1888, to bring something better in its train.

* * *

The English Watch Co., Villa Street, Birmingham, are now full up with orders, many of them being distinctly traceable to the new law upon the putting of foreign movements in English Hall-marked cases; several large dealers in that class of Geneva watches afterwards English levers, having placed their orders during the last month with *bonâ fide* English makers. We want a little more of that kind of legislation, and considerably less of the "Irish Question." This reminds me of a point in connection with the duties existing upon silver goods, a maker was expressing his sorrow to me that he was unable to make an article of use, in silver, to sell at a reasonable price, on account of the duty, although the present low price of silver would enable him to do it. Cannot we petition Government to remove this and put it, say, upon whiskey instead—it is only a delusion for the working man, and the proof can be seen any Saturday night in Birmingham, although trade is bad; or put it, say, upon cats, and make ample apologies to all the maiden ladies?

* * *

I send you illustrations of the latest novelty produced by the enterprising firm of Messrs. G. E. Walton & Co., Limited, of Hylton Street, Birmingham, which is in the form of a combination cedar pencil watch-key, to wind any watch, and a watch-



opener combined, each part of which would be in daily use by most people. It is intended to offer it at a price which will enable it to be retailed at twopence to the public; and this fact, combined with its general utility, should certainly command a ready and an immense sale.

* * *

There has been a good deal said and written from time to time about a little mischievous imp yclept the Printer's Devil, and many a trick has been laid to his charge, either wrongly or rightly; but I think it is quite time that something very strong and (if there is any part in his constitution that is touchable without the aid of a lathe strap or some equally forceable argument) something very touching were done about a very mischievous and incorrigible young person known as a "Jeweller's errand kid." He varies in age from a reputed thirteen years (there are no boys *under* thirteen now seeking employment, thanks to the School Board, though I feel bound to suggest that boys of thirteen are nothing like so big now as they used to be) to fifteen years, is somewhat dirty in appearance, and is equal to the occasion, whatever it may be, from "pitch and toss" to "manslaughter." To tack some nickname upon any peculiar person walking about the neighbourhood and follow him about in packs like wolves and howling at him until they drive him to madness and even death, as was the case recently, or to throw a paper bag of soot in the face of some passing lady (this I have seen), are some of his mildest forms of amusement. It is no use preaching sermons at him, he only sings "Wait till the Clouds roll by," and prepares for more tricks; it is very little use to bring force to bear, for if you kill one, "about 40 immediately come to the funeral." I leave this little matter for the consideration of his daily instructors, whoever they may be.

It appears that there is an old superstition still present in some peoples' minds about the figure eight and the combination of a number of figures eight being lucky; and so, in accordance with this belief and in hopes of finding new fields for their labours, a number of the jewellers are busy in designing brooches, pins, charms, &c., bearing all sorts of arrangements of 1888, &c.; and no doubt the figures can be made to produce a very pretty design, arranged with floral forms in combination, and if people will believe in luck, the Figure Jewellery may be made to take as great a footing as the Horse-shoe has had for so many years. Perhaps a few reminders of the light in which some ancient nations have regarded the figure eight may be useful to jewellers who are investigating this point of the subject, and who are too busy to hunt up their Ancient Mythology, Roman History, &c. According to the ancient "Calendaria," the Romans divided the entire year, beginning with the 1st of January, into weeks of eight days each. A similar usage is still known in some countries, where the expression, eight days, is frequently used as a week; this accounts for the eight-day clock of our grandfathers. October, the eighth month of the old Roman year (as the name signifies), was sacred to Mars, and a horse, called the "October Equus," was sacrificed to the deity. The Greek philosopher Pythagoras, who professed a belief in the mystical properties of numbers, dedicated the figure eight to Cybele, the Mother of all the Gods, whose image, in the remotest time, was only a cubical block of stone; so that we see that some centuries ago profound and learned people were "in a stew" about the figure eight, and the pot has been kept boiling ever since. Well, if the jewellers can add another fagot to the fire, the year 1888 will, no doubt, be grateful; and, if the idea takes, it will keep a large number of real and actual pots to be kept boiling—so I wish them every success.

## New Books.

Les Mervielles de L'Horlogerie.* This work, which is one of Hachette & Co.'s "Bibliothèque des Mervielles" series, is the joint production of MM. Camille Portal and H. de Graffigny—the former being an old student of the National School of Horology and the latter ex-chief editor of "La Science Universal." As the title indicates, it is rather popular than technological in character; nevertheless it contains a vast amount of information both interesting and instructive, combining the two in such a way as differs from any book of the kind that has hitherto been published either here or on the Continent. Thus we find a historical disquisition on ancient clocks and watches, closely followed by a chapter on the marine chronometer, involving technical details and the regulations for their trial and purchase by the French Marine under the law promulgated in 1883. It will be news to English chronometer makers to learn that "it has been proved that French chronometers are always superior to analogous instruments constructed by the foreigner." All the essentially French inventions are described in the book, the remaining most interesting chapters being those devoted to the pneumatic clock system of Paris, electric clocks, and those ingenious contrivances which are comprehended under the term "mystérieuse." To those acquainted with the language the book would prove exceedingly attractive reading, both from its peculiar lines and intrinsic merits as a whole; it is illustrated with 112 blocks.

Calvert's Mechanics' Almanack and Workshop Companion.† This useful little book has now reached its fifteenth year of publication, and the present number is in every respect worthy of its predecessors. As a work of reference for the artisan and handicraftsman it stands unrivalled. Among a variety of useful information scattered throughout its pages may be mentioned a very clear abstract of the Merchandise Marks Act and a paper on "Taking out Patents."

An appropriate book for the season has just made its appearance in the "Playground of Science,"‡ by Johnston Stephen. Although the experiments described in this little book do not bear directly upon any of the industries with which we are concerned, many of them are sufficiently cognate thereto to interest and afford valuable suggestions to practical minds, for which the wide extent of the ground covered gives an infinity of applications. As Mr. Stephen (whose name will be familiar to many of our readers in connection with former contributions to this journal) is a purist, it is almost supererogatory to add that the book is written in language intelligible to all, every experiment being accurately described and illustrated. We note, however, a slight mistake in the chapter on "The Pendulum and Tuning-fork," where Mr. Stephen has fallen into the not uncommon error of assuming the metre to be the length of a simple seconds pendulum. The book is well got up and carefully printed on good paper; and its modest price, together with the fact that the experiments described in it can be easily performed with the simplest apparatus by those totally unacquainted with science principles, should render its popularity assured.

## A New Compass.

The *Alta California* gives an account of the test of a new compass, invented by Mr. Leon Sirieix, a Frenchman by birth, and a graduate of the French Polytechnic. The compass as exhibited consists of a brass cylinder divided into two compartments. The lower compartment contains the corrector of the needle, while the upper division contains the compass card, which is swung on a pivot, as in the ordinary compass. On one side of the cylinder, close to the base, is a screw, and in the centre of the base is another. These are the adjusting screws, the first being used for correcting the permanent magnetism and the other for the correction of the induced magnetism. The inventor placed his compass on an imaginary ship, and laid her head due North, or, in other words, made the "lubber line" form one with the pole on the wall. The needle then pointed due North. On the other courses the same result was attained. The needle never deviated one degree from the North. Iron was placed around the compass, and the needle was observed to deviate a degree West. The inventor moved the second screw, and adjusted the needle carefully. The imaginary vessel was swung again, and on every course the needle pointed due North. It was also shown that the compass had no "heeling error," which was caused by the rolling of the vessel. A more severe test was applied, but the card remained perfectly horizontal:—The Sirieix compass was revolved at a great rate, much more than ever could be attained in swinging a ship, and directly the motion was stopped the compass card was seen to be still pointing North, and it had moved little more than half a degree on each side of the "lubber line." The compass card was swung round at a great rate—left to itself it became dead in about one minute's time; an ordinary compass would revolve probably five minutes or more. Mr. Sirieix has in his compass avoided the use of compensating magnets placed in the desk or binnacle, vertical bars, and other arrangements necessary to the compass mentioned. He has, to use his own expression, "centralised and neutralised" the magnetism of the ship in a spot directly beneath the compass card, thus succeeding where others have failed.

The *Alta* says: "Prof. Sladky, of the University of California, has testified in writing to the splendid performance of Mr. Sirieix's instrument, and it has also been examined by Lieutenants J. B. Milton, E. J. Dorn and G. M. Stoney, of the U. S. N., all of whom agree as to the efficiency of the compass."

* Paris: Librairie Hachette et Cie., 79, Boulevard Saint-Germain.

† Price 4d. London: John Heywood, 11, Paternoster Buildings; and of all booksellers.

‡ Price 1s. London: Published by Truslove & Shirley, 7, St. Paul's Churchyard, E.C.

# The Rating of Watches at Kew Observatory during the Year ending October 31, 1887.

*(From the Report of the Kew Committee.)*

THE arrangements for rating watches mentioned in previous Reports have been carried on during the year with continued success, and up to the present 1,344 watches have been examined and reported upon.

510 entries of watches were made as contrasted with 490 during the corresponding period of last year. They were sent for testing in the following Classes :—

For Class A, 463 ; Class B, 25 ; and Class C, 22.

Of these 174 failed to gain any certificate : 19 passed in C, 21 in B, 296 in A, and 13 of the latter obtained the highest possible form of certificate, the Class A, *especially good*.

In Table I. will be found statements giving the results of trial of the 26 watches which obtained the highest numbers of marks during the year, the premier position being attained—with 88·1 marks—by a keyless, double-roller, going-barrel watch, submitted by Jos. White, Earlsdon, Coventry.

This total exceeds that of last year, and it is also extremely satisfactory to note that a very marked increase has taken place in the number of watches which have gained more than 80 marks.

As some inconvenience was caused by the employment of temporary expedients to maintain the large watch-safe at an average of 65° F. for the "middle temperature" test, a burner was procured and fitted up with a shield, and the safe can now be kept at the desired point, whilst at the same time no deleterious fumes of coal-gas can penetrate into the interior chamber.

The three-rating safes are therefore now maintained by means of gas and ice at practically the three constant temperatures of 40°, 65°, and 90° F. respectively, all the year round.

Special attention continues to be given to the examination of *pocket chronographs*, in accordance with the request of the Cyclists' Union.

*Rating of Chronometers.*—Since the institution of chronometer trials, as mentioned in last year's Report, 27 movements have been examined, and certificates issued giving the mean daily rate and variation of rate at each change of temperature.

The trial occupies 35 days, divided into 5 periods of 6 days each, and 5 intermediate days, namely, 1 day at the commencement of each period of test :—

| | | | | | |
|---|---|---|---|---|---|
| 1st period. | Chronometer at temperature of | 55° F. | or | 13° C. |
| 2nd | ,, | ,, | ,, | 70° | ,, | 21° | ,, |
| 3rd | ,, | ,, | ,, | 85° | ,, | 29° | ,, |
| 4th | ,, | ,, | ,, | 70° | ,, | 21° | ,, |
| 5th | ,, | ,, | ,, | 55° | ,, | 13° | ,, |

Certificates are granted to chronometers which have undergone 35 days' test as specified above, and whose performance is such that :—

1. The mean of the differences in each stage of the examination, between (*a*) the average daily rate during that period, and (*b*) the several daily rates, does not exceed one second in any one of the stages.

2. The mean daily rate has not been affected by change of temperature more than one-sixth of a second per 1° F., which is about a quarter of a second per 1° C.

3. The mean daily rate has not exceeded ten seconds in any stage of the test.

A Kullberg's temperature regulator has been fitted by the maker to the chronometer oven, and a Richard thermograph is also arranged to work in the case with the chronometers, affording a continuous record of the temperatures which they have experienced during the whole of their trial.

The range of temperature from 55° to 85° F., to which the marine chronometers are submitted, has been decided upon after careful consideration as being amply sufficient for determining the behaviour of chronometers under conditions to which they are usually exposed at sea, and no serious objections have yet been received from makers or others to the adoption of the above range.

TABLE I.

RESULTS OF WATCH TRIALS. Performance of 26 Watches which obtained the highest number of Marks during the year.

| Watch deposited by | Number of Watch. | Balance Spring, Escapement, &c. | Mean daily rate. —Gaining. —Losing. | Mean variation of daily rate. ± | Mean change of rate for 1° F. | Difference of mean daily rate. Between pendant up and dial up. | Between pendant up and pendant right. | Between pendant up and pendant left. | Between dial up and dial down. | Difference between extreme gaining and losing rates. | Marks awarded for Daily variation of rate. | Change of rate with change of position. | Temperature compensation. | Total Marks. 0—100. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | secs. | secs. | secs. | secs. | secs. | secs. | secs. | secs. | | | | |
| Jos. White, Coventry ... ... | 29999 | Single overcoil, *d.r , *g.b. ... ... ... ... | +0·4 | 0·4 | 0·03 | —0·5 | +1·3 | +0·6 | +0·4 | 4·5 | 32·7 | 37·7 | 17 7 | 88·1 |
| Baume & Co., London ... ... | 2646† | Single overcoil, d.r., g.b.... ... ... ... | +2·4 | 0·5 | 0·02 | —1·5 | —2·1 | —2·6 | —1·8 | 4·25 | 30·0 | 36·2 | 18·9 | 85·1 |
| W. Holland, Rockferry ... ... | 3563 | Single overcoil, d.r., fusee ... ... ... ... | +3·3 | 0·6 | 0·003 | —0·2 | —1·1 | +0·5 | +2·8 | 5·25 | 27·1 | 36·2 | 19·8 | 83·1 |
| Stauffer & Co., London ... ... | 120186 | Single overcoil, d.r., g.b., bar-lever ... ... | +3·8 | 0·4 | 0·04 | +0·8 | —4·5 | —1·1 | —1·1 | 6·25 | 31·4 | 34·3 | 17·2 | 82·9 |
| Dowie & Son, London ... ... | 1545 | Duo-in-Uno, d.r., resting barrel ... ... ... | —1·1 | 0·6 | 0·03 | —0·1 | +0·6 | +2·0 | —0·5 | 5·0 | 27·9 | 37·0 | 17·8 | 82·7 |
| D. Buckney, London ... ... | 30191 | Single overcoil, d.r., fusee ... ... ... ... | +0·8 | 0·5 | 0·02 | —0·8 | +3·9 | +2·7 | +3·7 | 6·75 | 30·4 | 33·1 | 18·9 | 82·4 |
| Baume & Co., London ... ... | 2528 | Single overcoil, d.r., g.b., bar-lever ... ... | +3·4 | 0·4 | 0·10 | —1·3 | —1·3 | —0·8 | +1·8 | 6·5 | 31·5 | 37·4 | 13·2 | 82·1 |
| Stauffer & Co., London ... ... | 123174 | Single overcoil, d.r., g.b., bar-lever ... ... | +1·9 | 0·7 | 0·03 | +0·1 | —1·6 | +0·8 | —0·8 | 5·25 | 26·8 | 37·2 | 17·9 | 81·9 |
| Stauffer & Co , London ... ... | 111353 | Single overcoil, d.r., g.b.... ... ... ... | +1·5 | 0·5 | 0·03 | —4·7 | —1·3 | +0·2 | +3·0 | 8·5 | 29·0 | 34·6 | 18·0 | 81·6 |
| Stauffer & Co., London ... ... | 122288 | Single overcoil, d.r., g.b.... ... ... ... | +0·9 | 0·6 | 0·06 | +2·3 | +2·7 | +0·7 | —0·8 | 4·5 | 28·7 | 36·6 | 16·3 | 81·6 |
| Stauffer & Co , London ... ... | 114351 | Single overcoil, d.r., g.b.... ... ... ... | +2·4 | 0·4 | 0·05 | +2·4 | —2·8 | +3·9 | +0·7 | 8·25 | 32·9 | 31·4 | 17·0 | 81·3 |
| Baume & Co., London ... ... | 2529 | Single overcoil, d.r., g.b., bar-lever ... ... | +4·3 | 0·5 | 0·06 | —0·2 | —3·5 | —1·7 | —0·4 | 6·75 | 29·8 | 35·4 | 16·0 | 81·2 |
| Jas. White, Coventry ... ... | 29026 | Single overcoil, s.r., g.b.... ... ... ... | —0·9 | 0·6 | 0·06 | +0·6 | —1·3 | —2·8 | —1·4 | 6·0 | 28·6 | 36·2 | 16·3 | 81·1 |
| Jas. White, Coventry ... ... | 29024 | Single overcoil, s.r., g.b.... ... ... ... | +0·4 | 0·6 | 0·02 | —4·7 | —0·4 | —1·4 | +3·6 | 8·5 | 27·5 | 35·0 | 18·5 | 81·0 |
| Stauffer & Co., London ... ... | 123173 | Single overcoil, d.r., g.b., bar-lever ... ... | +1·9 | 0·5 | 0·04 | —1·7 | —3·0 | —5·3 | +1·9 | 7·75 | 30·9 | 33·0 | 17·1 | 81·0 |
| Stauffer & Co., London ... ... | 122289 | Single overcoil, d.r., g.b.... ... ... ... | +3 6 | 0·6 | 0·03 | +4·1 | +1·5 | —0·3 | —1·4 | 7·75 | 28·8 | 34·1 | 18·0 | 80·9 |
| Usher & Cole, London ... ... | 25738 | Flat spring, s.r., g.b. ... ... ... ... | +0·5 | 0·7 | 0·03 | —1·5 | —2·9 | —0·8 | +1·6 | 6·75 | 26·5 | 36·3 | 18·0 | 80·8 |
| R. Crook, London ... ... | 899 | Single overcoil, s.r., g.b.... ... ... ... | —2·3 | 0·6 | 0·04 | —0·8 | +2·3 | —3 0 | +0·1 | 7·25 | 28·4 | 34·8 | 17·6 | 80·8 |
| Baume & Co., London ... ... | 2530 | Single overcoil, d.r., g b., bar-lever ... ... | +1·5 | 0·4 | 0·10 | +1·4 | +1·0 | +3·8 | —2·5 | 7·0 | 31·8 | 35·4 | 13·5 | 80·7 |
| Stauffer & Co., London ... ... | 123158 | Single overcoil, d.r., g.b., bar-lever ... ... | —4·8 | 0·4 | 0·09 | —0·4 | +0·4 | +3·1 | —1·0 | 8·0 | 31·2 | 35·5 | 14·0 | 80·7 |
| Stauffer & Co., London ... ... | 120184 | Single overcoil, d.r., g.b., bar-lever ... ... | —1·0 | 0·5 | 0·05 | +0·8 | —2·0 | —3·7 | —1·2 | 6·0 | 29·6 | 34·3 | 16·7 | 80·6 |
| A. P. Roger, Guernsey ... ... | 123172 | Single overcoil, d.r., g.b.... ... ... ... | —0·5 | 0·6 | 0 01 | +1·0 | —0·7 | —3·4 | —4·6 | 8·0 | 28·5 | 33·0 | 19·1 | 80·6 |
| J. Player, Coventry ... ... | 24619 | Single overcoil, d r., g.b.... ... ... ... | +5·7 | 0·6 | 0·08 | +0·1 | —0·7 | —0·1 | —0·8 | 5·75 | 27·1 | 38·6 | 14·7 | 80·4 |
| H. Golay, London ... ... ... | 14776 | Double overcoil, d.r., g.b. ... ... ... ... | +3·0 | 0·4 | 0·05 | +0·5 | —4·6 | +2 2 | —2·5 | 7·5 | 32·0 | 31·8 | 16·5 | 80·3 |
| A. E. Fridlander, Coventry ... | 52465 | Single overcoil, d.r., g.b.... ... ... ... | +2·8 | 0·4 | 0·09 | +1·2 | —2·1 | —2·2 | —0·2 | 5·75 | 31·0 | 34·5 | 14·6 | 80·1 |
| Stauffer & Co., London ... ... | 120842 | Single overcoil, d.r., g.b., bar-lever. ... ... | +1·6 | 0·5 | 0·08 | +4·0 | +1·3 | +1·9 | —0·6 | 6·5 | 30·8 | 34·9 | 14·4 | 80·1 |

* d.r., double-roller ; s.r., single roller ; g.b., going-barrel. † Split seconds chronograph without minute-recorder.

Table II.

Highest Records obtained by Complicated Watches during the year.

| Description of Watch. | Number. | Deposited by | Marks awarded for | | | Total marks, 0—100. |
|---|---|---|---|---|---|---|
| | | | Variation. | Position. | Temperature. | |
| Minute and seconds chronograph and repeater ... | 14768 | H. Golay, London ..... | 32·1 | 34·2 | 10·7 | 77·0 |
| „ „ „ „ ... | 14750 | „ „ ..... | 27·7 | 33·3 | 11·3 | 72·3 |
| Perpetual calendar and repeater ..... | 01922 | S. Smith & Son, London ..... | 26·1 | 34·2 | 16·7 | 77·0 |
| „ „ „ ..... | 14759 | H. Golay, London ..... ..... | 28·3 | 35·5 | 10·7 | 74·5 |
| Split-seconds and minute-recorder chronograph | 9818 | E. R. Shipton, London ..... | 26·6 | 34·5 | 17·6 | 78·7 |
| „ „ „ „ | 07369 | H. Golay, London..... | 28·8 | 30·2 | 14·7 | 73·7 |
| Split-seconds chronograph (without minute dial) | 2646 | Baume & Co., London..... | 30·0 | 36·2 | 18·9 | 85·1 |
| Ordinary minute and seconds chronograph..... | 2427 | Baume & Co., London ..... | 27·6 | 35·8 | 16·4 | 79·8 |
| „ „ „ „ ..... | 123820 | Stauffer & Co., „ ..... | 27·8 | 32·4 | 16·9 | 77·1 |
| „ „ „ „ ..... | 2426 | Baume & Co., „ ..... | 28·0 | 33·2 | 15·5 | 76·7 |
| Repeaters ..... ..... | 31578 | H. Capt, Geneva ..... .. ..... | 30·0 | 34·3 | 14·2 | 78·5 |
| „ ..... ..... ..... | 14752 | H. Golay, London . ..... | 26·8 | 33·9 | 13·8 | 74·5 |

## The Legend of the Koh-i-Noor.

IN a recent article of mine which lately appeared in this journal, a reference was made to the oft-repeated tale of the manner in which Runjit Singh got the Koh-i-Noor from Shah Shoojah. Since writing that article I have found that there is no truth in the story, and I write this as a correction. The usual relation is, that after Runjit Singh had exhausted all his wiles to make Shah Shoojah deliver the diamond, he resorted to an interview, and taking advantage of the Oriental obligations of ceremonial customs, suddenly proposed, at the end of the interview, an interchange of puggerees or turbans, as a mark of friendship. This, according to the story, the Shah could not refuse, and the Koh-i-Noor was in the puggeree. In Cunningham's *History of the Sikhs*, p. 154-5, the action is very briefly told:—that Runjit used every effort to cause Shah Shoojah to deliver up the gem—sums of money were offered and refused. At last the Sikh monarch paid a visit to the Shah, and after mutual declarations of friendship, and the promise of a jaghire, or landed estate, with a rental of 50,000 rupees, or £5,000 a year—100,000 rupees had been demanded—the diamond was given up. The promise was never carried out. From another source I learn that it is understood that a document was drawn up, giving the terms of the negotiation. This was in 1813 or 1814, and it is confirmed by what took place in 1832. Shah Shoojah was anxious at that date to make an effort to regain his throne. He applied to Runjit Singh for assistance in men and money; for which he offered a number of advantages, among which was an offer of acquittance for the Koh-i-Noor diamond. *History of the Sikhs*, p. 201. Another evidence may be referred to which would in itself throw a doubt upon the matter, even if we had not the reliable data which has just been given. It is this: the very same story is told as the stratagem by which Nadir Shah got the Koh-i-Noor from the Delhi emperor on his famous raid into India. This is not likely to be true. From what we know of Nadir, he would not have performed such a roundabout trick; his plan would have been to have ordered the emperor's nose and ears to be cut off; if that failed, the eyes would be gouged out; and, finally, the order to cut off the head would have been given. That was the kind of diplomacy he was accustomed to. I take this story to be an old legend, and would not be surprised now to find it coming down to us associated with the history of any celebrated gem in India.

William Simpson.

## The Lever Escapement

CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. Grosclaude, Professor at the Geneva School of Horology.

(Translated from the French.)

*(Continued from page 91.)*

THIS shape is shown in fig. 5; but workmen will be but little disposed to accept such an inconvenient form. On the other hand, if we are only willing to adopt such forms as can be easily executed, we find that we cannot entirely satisfy the requirements of theory, and we must only seek to approach it as nearly as possible.

In figs. 8, 9 and 10, for the club-tooth escapement, three different designs are represented, which have their advantages and their drawbacks. Thus, in fig. 8, where the inclines of the pallet and tooth are convex, the advantage of having at the commencement of the impulse a slow movement of the wheel is counterbalanced by the considerable acceleration which takes place at the finish, producing a drop with a relatively violent shock. In figs. 9 and 10, where one only of the inclines is convex, this disadvantage is the same, though in a lesser degree. The concave inclines are so bad for club-tooth escapements that we abandon them here entirely. They might be made use of for the escapement with ratchet teeth (fig. 7), but the fault of the tooth striking the incline at a distance from the locking corner would be still greater than in the case before spoken of. The convex form (fig. 6) would be certainly preferable; but it should not be forgotten that with it the speed of the wheel is increased at the moment the tooth leaves the incline.

To sum up, excepting the half-convex and half-concave form from the club-toothed escapement, we do not see any advantage to be gained by departing from the right lined incline such as is generally adopted. But, among all those that may be traced in the club-toothed escapement, we have before selected a broken line, a, e, d, a′ e′ d′ (fig. 3, page 75, reproduced at *a* and a′, figs. 13 and 14). It now remains to justify our choice.

If the incline of the pallet is steep (fig. 11), and if that of the tooth is little, or *vice versâ* (fig. 12), the *départ* will be good, but the drop will be strong. It is necessary then to approximate to the right line; we say approximate, because the perfectly right line itself would be imperfect. In fact, for greased or oiled surfaces the resistance to the sliding is greatly increased when

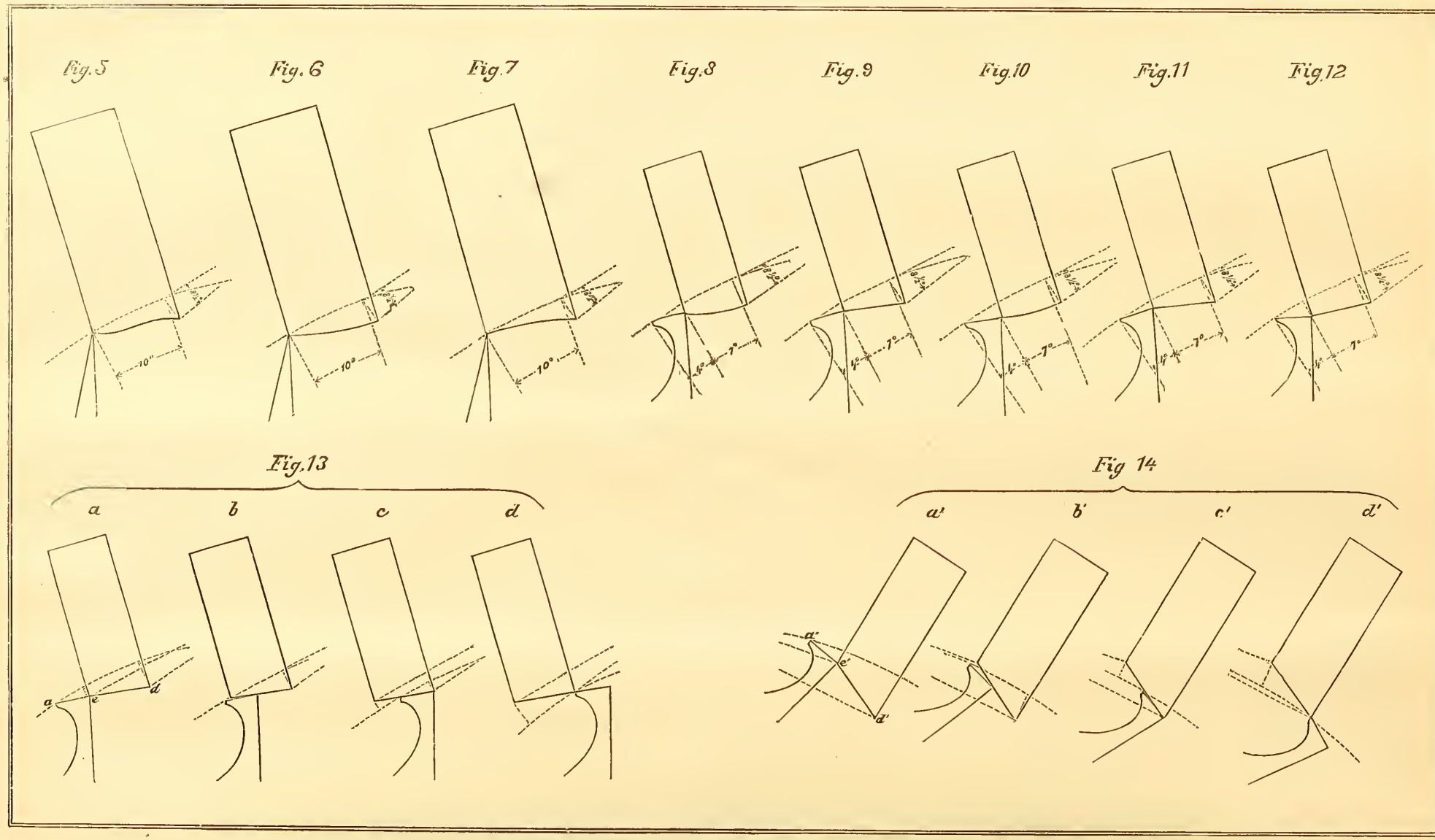


Fig.5
Fig.6
Fig.7
Fig.8
Fig.9
Fig.10
Fig.11
Fig.12
10°
7°
Fig.13
a
b
c
d
Fig 14
a'
b'
c'
d'

the surfaces are touching one another; the two inclines should be arranged at such an angle that the surfaces do not come into complete contact with one another.

The line *a*, *e*, *d* is, therefore, bent to a small angle in order to conform to the preceding arguments.

At *a*, *b*, *c*, *d* (fig. 13), and at a′, b′, c′, d′ (fig. 14), are represented four different positions of the entrance and exit pallets respectively. The lift is effected by, in the first place, the point of the tooth sliding along the incline of the pallet, and then by the heel of the pallet sliding along the incline of the tooth. The same thing takes place for the exit lift. We think this arrangement preferable to that which would make the point of the pallet slide (fig. 12) at first upon the incline of the tooth, and then the heel of the latter act upon the incline of the pallet.

We do not expect our selection will please every watchmaker, because other conditions that have escaped us may perhaps cause another arrangement to be preferred; but it will be acknowledged at least that our method for drawing the escapement has the advantage of allowing everyone to choose, as regards the relation between the inclines, their forms and directions without, by changing the point of departure that shall have been chosen, knowing the drop, the angle of lift, and the locking. It remains now to study the effect of friction, which constitutes, like inertia, one of the most important points for consideration.

*(To be continued.)*

# The Theory of Adjustment.

By M. L. Lossier.

After the Memoir of M. Jules Grossmann.—From the *Journal Suisse D'Horlogerie.*

## FIRST ARTICLE.—Introduction.

FOR some considerable time the adjustment of watches and chronometers has been a long and patient search for the best conditions to secure the good performance of these instruments—a pure matter of groping in the dark—among the greater part of those engaged in it who depend on the data of experience, valuable without doubt, but not generally depending on any rational consideration. It is only since the works of Phillips—that is, since a mathematician and engineer of the greatest eminence, ceasing to see in horology a special and distinct art, essayed to apply to it the principles of rational mechanics—that the adjustment has really become a scientific study; and it is since that time that we have seen born and grow, year by year, the marvellous results that our Observatory trials verify.

It is even in the same spirit that the following work has been written. The adjustment is related to the precise and clearly defined principles of mathematical mechanics, and if all the points of detail have not yet been submitted to analysis, it may almost be affirmed that the springers and timers should give place to scientists, and that the time is not far off when it will be possible to adjust a watch almost to the extreme limits without having seen it go.

This assertion may appear rash to many horologists, and yet, when a constructor makes a locomotive he is able to say in advance, and before the least grain of coal has been burnt in the furnace, the speed his machine will have; when an engineer erects an iron bridge, he knows beforehand the exact amount of flexion of each fibre under the weight of a train—he has calculated the precise effort that each rivet will have to support. It is with machines as with the large constructions—all the forces in play, all the functions have been, from the beginning, submitted to a hard mathematical dissection which, calculating all, leaves nothing to chance. Why has it not been the same in horology? Let us leave to others the care of answering this question and prove only that it was in applying, purely and simply, mechanics to horology—in adapting to the balance spring the laws of elasticity and the formulæ he had found for the springs of railways—that Phillips was conducted to his admirable works.

The director of the school of horology of Locle, Mr. Jules Grossmann, following this fertile course, gave, in a series of articles published in the *Deutsche Uhrmacher und Zeitung* (1882-83), a supplement to the theory of Phillips, extending it to the particular cases that present themselves in watchmaking, studying the influence of various disturbing causes, notably of frictions, of the curb pins, of the escapement, &c., and precising the differences that exist between the cylindrical and flat springs. Unfortunately these studies, like the rest of Phillips's memoir, require, in order to be understood, a knowledge of mathematics inaccessible to watchmakers. And if, as I have above said, I think that mathematical mechanics should be understood by watchmakers, it is convenient meanwhile to amplify nothing and to reduce this study to a suitable limit; that is, to that which a young man of medium intelligence can learn in a professional or industrial school.

It is this which has induced me to essay to translate Mr. Grossmann's memoir, not precisely into vernacular language, but into language accessible to anyone who has followed an elementary course of algebra and mechanics. I have kept as much as possible to the lines followed by Mr. Grossmann, so that the better part of his arguments are translated literally; but the task I have undertaken of eliminating too difficult demonstration has rendered it necessary to transform entirely certain parts. I do not claim to have improved upon the author in anything, but am only forced to leave out the greater number from a work whose incontestable utility is only accessible to the privileged few.

To facilitate the reading of these pages to those who cannot readily call to mind the elementary principles of mechanics, I have added notes wherever the knowledge of rules or formulæ is necessary for the comprehension of the principal text.

Besides, as certain demonstrations essentially algebraical will appear perhaps a little difficult to some persons to read, these will appear printed in smaller characters in order that they may be, at a first reading, left on one side.

It will be understood meanwhile, from what has been said above, why I have not thought fit to take away from this work its character of mathematical study. Mathematics are the language of theoretical mechanics—a language admirable in clearness and precision (a simple little formula often saving more than ten pages of explanations); and to form the theory of horology without mathematics is, to my mind, as difficult as to make a watch with neither file nor graver.

Nevertheless, I have wished to take into account also, to a certain extent, the wants of practical watchmakers of the old school, who, being content with the results obtained, have neither the time nor the desire to follow the long developments from which these results proceed; it is, then, for their sake that I have condensed the general conclusions of Phillips, Grossmann, and others, in a *résumé* which will terminate this work and which will be completely exempt from formulæ.

L. Lossier,

*Directeur de l'Ecole d'Horlogerie de Besançon.*

Note.—The units of measure adopted in this memoir are: the millimetre, the gramme, and the second.

Angles are always represented in the formulæ by the Greek letters, $\alpha$, $\beta$, $\gamma$, &c., and should be measured—unless special indication—in length of arc, the radius being taken of unit; the unit of angle will be then $\pi = \frac{1}{2}$ circumference, and all the angles will be figures in multiples of $\pi$.

g indicates the acceleration due to gravity = 9808 mm, 8.

The mass $m$ of a body is the weight $p$ of the body divided by $g$:—

$$m = \frac{p}{g}.$$

## CHAPTER I.

General Notions. Laws of the Balance and Balance Spring.

The Pendulum.—Although it is the adjustment of watches that is specially treated of here, that is to say, the study of the spring and the balance, we lay the first bases of this study by

treating on the movement of a pendulum, because the demonstration of the formulæ respecting the latter are easier to establish and more evident. We shall see presently that these formulæ are easily applied to the movement of the balance spring. The *simple pendulum* consists of a heavy weight without magnitude, suspended from a fixed point by means of a fillet without weight.

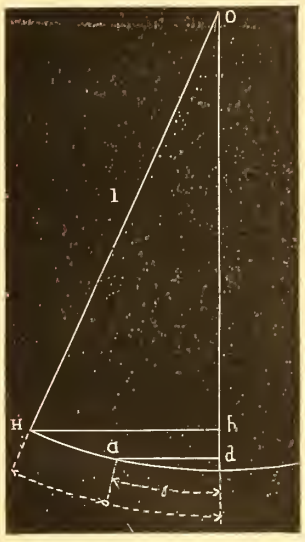
When the heavy point is moved from the vertical it returns, under the effect of gravity, with an accelerated speed to the neuter point; then, by the speed acquired, it passes farther, ascending with a retarded speed ; and so on.

The movement from one extremity to the other of the course of the pendulum is called an *oscillation*.

Let us find on what factors the duration of an oscillation depends. For that it is necessary at first to seek a formula which allows us to calculate the speed at different points of its course ; and that is very simple in taking into account the laws of falling bodies.

In effect we know that the pendulum descending from $H$ to $B$ (fig 1) will reach this point with the speed it would have acquired in falling from the vertical height $h\,B$ ; its speed will be then* :—

$$V = \sqrt{2\,g \times h\,B}.$$




The length $h\,B$ being undetermined, may be expressed by $l$, the length of the pendulum, and $\alpha$, the space traversed, by recalling the fact that a chord is the mean proportional between the diameter and its projection upon this diameter (*Géomtéry*, André, Book III., 241). Assuming the oscillations to be very small, and taking the chord for the arc, we have :

$$h\,B : \alpha = \alpha : 2\,l$$

from whence

$$h\,B = \frac{\alpha^2}{2\,l}$$

and

$$V = \sqrt{2\,g \times \frac{\alpha^2}{2\,l}} = \alpha\sqrt{\frac{g}{l}}.$$

It is also quite easy to determine the speed of any point $D$ at a distance $\gamma$ from the point $B$.

Assuming the height $h\,d = h\,B - d\,B$, and replacing $h\,B$ by its value $\frac{\alpha^2}{2\,l}$ and $d\,B$ by $\frac{\gamma^2}{2\,l}$, which we had found by the same reasoning, we have :—

$$h\,d = \frac{\alpha^2 - \gamma^2}{2\,l},$$

and, for the speed of the pendulum at $D$,

$$v = \sqrt{\frac{g}{l}(\alpha^2 - \gamma^2)}.$$

The speed neither being uniform, nor uniformly varied, we are not able to deduce directly by elementary algebra, from the expression of the speed, the time occupied by the mobile in descending from $H$ to $B$ ; but ean ascertain it indirectly by eomparing the movement of a pendulum to that of a ruby pin whose plan of rotation is that of the figure.

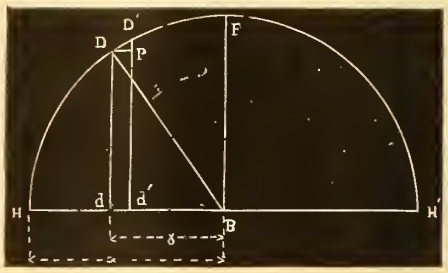

* When a mobile A, starting from a point $H$, descends the length of an inclined plane $HD$, its speed, on arriving at the lowest point $D$ is the same as if it had descended vertically from the same height $HO$, that is to say

$$v = \sqrt{2\,g \times H\,O}.$$

It is found indeed that, if we turn upon a eircumference (fig. 2) having the length $H\,B = \alpha$ for radius, a mobile $D$ travelling with a speed $V = \alpha\sqrt{\frac{g}{l}}$, the projection of its movement upon the right line $H\,B\,H'$ will follow strictly the movement of the pendulum.

We find thus very easily the time oceupied by the pendulum in making one oscillation, sinee it is the same as that taken by the mobile of comparison in making a half turn.

The time $T$ will be :




$$T = \frac{\text{space traversed}}{\text{speed}} = \frac{\pi\,\alpha}{\alpha\sqrt{\frac{g}{l}}}$$

or

$$T = \pi\sqrt{\frac{l}{g}}$$

To prove the similitude of the two movements : (1) Deseribe, with $\alpha$ for radius, a half circumference (fig. 2) traversed by a mobile $D$ having a speed $V$, and ascertain what will be the speed of the projection of the mobile $D$, at a point $d$, at a distance $\gamma$ from the centre $B$.

While the mobile goes from $D$ to $D'$, its projection will traverse $d\,d' = D\,P$.

The arc $D\,D'$ being taken very small, identifies itself with its chord, and we have two similar rectangular triangles $D\,D'\,P$ and $D\,B\,d$, in which

$$\frac{D\,P}{D\,D'} = \frac{D\,d}{D\,B} = \sqrt{\frac{\alpha^2 - \gamma^2}{\alpha}}$$

from whence, calling the speed of the projection $v$

$$\frac{V}{v} = \sqrt{\frac{\alpha^2 - \gamma^2}{\alpha}}$$ (The speeds are between them as the distances travelled over.)

and, replacing $V$ by its value $\alpha\sqrt{\frac{g}{l}}$,

$$v = \frac{\alpha\sqrt{\frac{g}{l}}\sqrt{\alpha^2 - \gamma^2}}{\alpha}, \text{ or } v = \sqrt{\frac{g}{l}(\alpha^2 - \gamma^2)}.$$

This is the speed of the projection of $D$ upon the line $B\,H$ at a distance $\gamma$ from $B$, and is also the speed of a pendulum at a distance $\gamma$ from its neuter point ; then, the two movements are identical.

*(To be continued.)*

## American Items.

IT is difficult to understand in these days of easy communication, says the *Waterbury*, when manufacturers can as readily send forth travellers and canvassers as ean the jobbers, why the maker and the seller do not come into direct contact. The retailer is the direct support of the manufacturer, and he should enjoy all the advantages there are to be had. If the goods can be sold a few cents cheaper to the jobber, then why is not the retailer entitled to these few cents ?

The two following paragraphs will interest some of our Lancashire readers :—

The *Jewelry News* (New York) says : According to one of our English exchanges, the project of starting a watch factory at Prescot, Lancashire, is being vigorously pushed, and from appearances, with every hope of success. As the East India British Possessions contain a population of 250,000,000 souls, a protective tariff might secure to the English watch industry a profitable market. It is hoping too much, however, that a success of the enterprise lies in the near future.

The *Jeweler's Weekly* (New York) says : At last the Rip Van Winkles of the English watch trade have awaked from their long sleep. They are busily engaged rubbing the cobwebs of prejudice from their senile eyes, and like the luckless hero of Washington Irving's legend, are amazed at the changes which have taken place since they gave themselves up to the drowsy god of conservatism. And what an awakening it is ! Parliament, the nobility, capitalists and tradesmen, all combine to support the ancient industry in its commendable efforts at rejuvenation. With such co-operation, the factory to be established at Prescot on the American plan has every prospect of ultimate success. Columbia looks on approvingly meanwhile. If she can be of any assistance to the old gentleman across the water let him say the word. And that reminds us that she was three-and-a-half generations old last sky-rocket day.

The *Herald* cup, won by the sloop yacht, "Volunteer" at Marblehead, is now completed, and has lately been on private exhibition at the showroom of Bigelow, Kennard & Co., the makers. It is a massive punch bowl with three heavy silver handles, the whole supported by three large and handsomely carved silver legs. Upon one side is a shield inscribed "The Boston *Herald* Cup," while the reverse bears another shield inscribed : "Won by the 'Volunteer,' Charles J. Paine, owner, Marblehead, August 11, 1887." The whole is of oxidised silver, lined with gold, and is the largest and most elaborate piece of this kind ever made in Boston. It will shortly be placed on public exhibition.

From Canadian exchanges we learn that the Toronto retail jewellers and watchmakers are highly indignant at the competition they have discovered in a new and unexpected quarter. The leading stationers are engaging hands to run a watch repairing department in connection with the stationery business. In consequence it is expected that the watch repairing business will become stationary. . . . The Canadian Custom authorities have seized smuggled jewellery to the amount of 6,000 dols.

## Anniversary Dinner of the Horological Club.

THE Eighth Annual Anniversary of the Horological Club was celebrated by a dinner at the Horological Institute, Northampton Square, last month. The chair was filled by Mr. D. Glasgow, treasurer of the club, and the vice-chair by Mr. C. Dunn. Among the numerous company assembled were Messrs. D. Buckney, T. Mercer, V. Kallberg, W. Barnsdale, L. Donne-Donne, jun., W. Evans, A. Jaccard, J. Oliver, T. J. Willis, T. Willis, jun., F. Willis, T. Buggins-Buggins, jun., C. Curzon, W. G. Schoof, W. Bromley, H. Bickley, hon. sec., &c.

The Chairman, in proposing "Success to the Horological Club," remarked on the great pleasure he had derived from his connection with it. He always looked forward to the meetings of the club as a great source of enjoyment, and undoubtedly some of the pleasantest hours of his life had been the Friday evenings spent in that room. The club had done much to promote good fellowship among the various members of the trade. He hoped it would long flourish and give to future members as much pleasure and enjoyment as it had given to him.

Mr. Buckney, in responding, said that he was proud to be a member of the club, and only wished he could attend oftener. He would like to see a better attendance at their ordinary meetings. Everything was done to make members feel at home, and they hardly knew how much they lost by being absent, especially on musical nights.

The Chairman next gave "The Charitable Institutions of the Trade;" and in doing so, observed that the long and terrible depression under which the trades of Clerkenwell had suffered had told on its charitable institutions in a double sense, inasmuch as while the applicants for relief had been more, the income of the charities had necessarily been less. It behoved them all to do something, however small, to help those who could no longer help themselves, and in this spirit the committee had placed a box (given by their good friend and member, Mr. Pitkin) on the club table for small contributions in aid of the Clock and Watchmakers' Pension Society. The sum obtained might not be much, but it would, at any rate, be an earnest of their good intentions.

Mr. Barnsdale, past chairman of the Clock and Watchmakers' Asylum, returned thanks.

The Vice-Chairman, in proposing "The Health of the Committee," spoke in appreciative terms of the valuable work done by those gentlemen.

Mr. Willis, in reply, said that if the committee continued to pull together as they had hitherto done, they were bound to succeed.

The Chairman next gave "The Health of the Honorary Secretary." This, he said, was a toast that needed but few words, or, for that matter, no words at all, to ensure its hearty reception. They all knew with what earnestness their honorary secretary had applied himself to the duties of his office from the first. His untiring exertions in the service of the club were worthy of all praise ; he not only grasped its aims and purpose, but entered with the most self-denying labour into the smallest detail connected with its working. He (the Chairman) felt himself restrained by the presence of their honorary secretary from saying all that he would wish, but he would ask them to join heartily in drinking to Mr. Bickley's good health, and, if it were not too selfish a wish, in hoping that he might long remain their honorary secretary.

Mr. Bickley, in returning thanks, said he was glad to find that "time did not wither nor custom stale" the spontaneous expression of their good wishes towards him. Their club embodied a principle that had always been dear to the people of this country, namely, the principle of social intercourse and good-fellowship. It would be impossible to say how much the history and progress of this country in art, science, literature and politics was indebted to the happy custom of men meeting together and exchanging ideas in a social and friendly way. Considering that this custom prevailed in all ranks and professions, it would indeed be strange if watchmakers stood alone in ignoring its pleasures and advantages. He thought they might congratulate themselves on the eight years' work of the club. There had, of course, been changes in its *personnel*, that was inevitable—and they would be glad of more members ; but they were financially sound ; and with a better attendance on ordinary meeting nights, there would be nothing to complain of. In again thanking them, he hoped they might meet together for many years to come.

"The Health of the Chairman" was proposed, in eulogistic terms, by Mr. L. Donne. The watch trade, he said, was much indebted to Mr. Glasgow for the manner in which he had always upheld its interests. The Horological Institute especially owed him a deep debt of gratitude for the time he had given to its affairs. The erection of the building they were then in was in no small measure due to his exertions.

The Chairman in response said that he should always look back to the time he had spent in connection with the Horological Institute and the Horological Club as the most useful of his life.

Mr. Bickley, in giving the toast of "The Musical Director and Horological Glee Party," said they had to regret the absence of their esteemed musical director, Mr. Knight, and read a letter from that gentleman excusing his absence. In speaking to the

toast, Mr. Bickley alluded to the monthly musical meetings of the club as one of its most attractive features. For himself he hardly knew of a pleasanter way of spending an evening than in listening to good music in familiar company. He had heard visitors to the club speak in the highest terms of the musical entertainment, and for this result they had chiefly to thank Mr. Knight and his able coadjutors, the Horological Glee Party.

Mr. C. R. COPPENDALE returned thanks. He was sorry Mr. Knight was not present to participate in the thanks so warmly given. He knew that he took a great deal of trouble to make the musical evenings successful, and that their appreciation would form his highest reward. Speaking for the Horological Glee Party, he could assure them they were delighted to give their services, and hoped to be able to make them still more acceptable.

Among the remaining toasts were "The Vice-Chairman,"—to which Mr. DUNN, in reply, urged upon the members to be more regular and early in their attendance,—"The Visitors," and "The Ladies."

The concerted music, given by the Horological Glee Party, added much to the pleasure of the evening, as did also the solos of Messrs. E. Bennee, Coppendale, Stevens and Willis. Mr. A. S. Bennett ably presided at the pianoforte.

## The Dresden Collection.

THE Historical Museum of Dresden contains among its treasures a very extensive miscellaneous accumulation of articles in precious stones, which are the progeny of a period extending from the close of the 16th to the beginning of the 18th centuries. It was begun in the reign of Duke George (about 1539); but the Elector Augustus (1553—1586) was the first to deposit this accumulating wealth of art treasures in the apartments of the Saxon royal palace called the "green vaults." These rooms, eight in number, preserve one of the most unique collections of precious things found in Europe. These ornamented things comprise military weapons and defensive armour belonging to the Saxon Kings: cups, vases, goblets, snuff-boxes, spoons, knives, cane-heads, drinking horns, fruits, musicians, harlequins, daneers, peddlers, dwarfs, animals, and various other objects all more or less decorated with precious stones and pearls.

From this bewildering mass one can select specimens which afford interesting and curious studies illustrating the skill, ingenuity and patience of the artist, and, sometimes, beauty in design. Here is seen a fireplace decorated with pearls and different species of precious stones; a monument constructed of corals, enamels and gems; a grotto of misshapen pearls; an oak cabinet covered with amber mosaics; portraits of the popes and emperors cut in gems; a mirror of rock crystal; a ball, 22½ inches in circumference, of the same kind of stone; and a crystal beer-pot, embellished with jewels and cameï, valued at 5,000 dols. Court dresses, royal trinkets, orders, decorations, chains, badges or favours, all loaded with gems, show the barbaric splendour of the Saxon court. This museum contains a large onyx, measuring 6⅔ by 4¼ inches, set in a gold crown, adorned with emeralds, diamonds and pearls. One of the productions of Dinglinger—jeweller to Augustus the Strong, whose skill won for him the title of the "German Cellini"—represents the Mogul Emperor of India, seated on his "Peacock Throne," surrounded by numerous courtiers and ambassadors paying homage to the great potentate, all executed in gold, enamel and precious stones. This royal toy cost the artist eight years of labour, and the Prince for whom it was made paid 58,485 thalers, or more than 40,000 dols. There are more than 400 different objects made of ivory, embellished with gems and enamel, and 200 portraits engraved on gems. The diamonds are numerous, one ornament alone, for a lady's hair, comprising 62 of these gems,

## Workshop Memoranda.

TO CLEAN PEARLS.—Soak them in hot water in which bran has been boiled with a little salts of tartar and alum, rubbing gently between the hands when the water will admit of it. When the water is cold, renew the operation until the discoloration is removed; rinse in lukewarm water and lay the pearls in white paper in a dark place to cool and dry.

THE following is a liquid which will dissolve silver—without attacking copper, brass or German silver—from silvered objects, plated ware, &c. It is a mixture of one part of nitric acid with six parts sulphuric, heated in a water bath to 160° Fahr., at which temperature it operates best.

A VERY good poising tool can be made by adapting to an end of an ordinary depthing tool two new centres of steel wire—about a half-inch of the inner end of each of which is filed away somewhat beyond the diametrical line. Harden and polish these ends, and they will present, when properly fastened in the tool by the set screw, a very nice sharp angle on which to poise the balance. The adjustment for the length of the staff is, of course, made by the screw which opens the tool.

SOLDERING.—To repair a ring, the shank of which requires soldering, bury the head in a crucible full of wet sand, place a small piece of charcoal against one side, coat the break, previously cleaned by filing or scraping, with borax, and charge with solder; blow a flame against the ring and charcoal until the solder runs in. For articles which require to be protected against discolouring in the process of soldering, coat them with a mixture of burnt yellow ochre and borax, adding a little dissolved gum tragacanth to make it lay all over; allow it to dry, then charge with borax and solder and heat sufficiently. Boil out in weak pickle made of nitric or sulphuric acid. One important point is to wash the piece well in hot water with a little ammonia in it before attempting any repairs; this removes all dirt and grease, which, if burned on, cannot be removed. If the article be of coloured gold, boil out in pickle made of muriatic acid, and never coat with any protecting mixture. The solder must vary in regard to fusibility according to the quality of the article. For repairing most filled work, very easily melted solder is required, which may be made of 1 ounce of fine silver, 10 pennyweights hard brass wire, adding 2 pennyweights zinc just before pouring; or, to make it more fusible, use bar tin instead of zinc; or, for stronger silver solder, use only the silver and brass For repairing most bright gold work, use gold coin, 3 pennyweights; fine silver, 3 pennyweights; fine copper, 2 pennyweights. For coloured work: fine gold, 1 pennyweight; silver, 17 grains; copper, 12 grains; hard brass wire, 2 grains. A good solder for repairing spectacles or other steel work is made by melting together equal parts of silver and copper. In soldering steel, plenty of borax should be used.

## Gazette.

PARTNERSHIPS DISSOLVED.

Crouch & Clemence, Poultry, goldsmiths. Thompson & Vine, Aldersgate Street, watch manufacturers. A. & T. Lashmore, Oswestry, jewellers. Pearson & Forrester, Birmingham, electro-platers. Nathan & Davis, Birmingham, manufacturing jewellers.

THE BANKRUPTCY ACT, 1883.

RECEIVING ORDERS.

*To surrender in London.*—Jane Bache, Wilmington Square, jeweller. J. Otto Schuler, Hatton Garden, goldsmith.

*To surrender in the Country.*—Samson Manoah Ayers, Dewsbury, watchmaker. Francis James Tyers, Birmingham, late jeweller. Thomas Turner, Whitby, jet ornament manufacturer.

PUBLIC EXAMINATIONS.

*In London.*—Jane Bache, Wilmington Square, jeweller; January 18, at 11.30. G. Warwick, Poland Street, Oxford Street; January 24, at 12.30.

*In the Country.*—W. Dyer, Birmingham, jeweller; January 6, at 2. H. Harris (trading as Henry Harris & Co.), Birmingham, jewellers' factor; January 9, at 2. S. M. Ayers, Dewsbury, watchmaker; January 17, at 11.

ADJUDICATIONS.

*In London.*—W. Jardine, (trading as Jardine & Co.), Great Winchester Street, diamond merchant. Jane Bache, Wilmington Square, jeweller. J. O. Schuler, Hatton Garden, goldsmith.

*In the Country.*—S. Bradley (trading as John Payne), Birmingham and Blackpool, jeweller. S. M. Ayers, Dewsbury, watchmaker. J. H. Hunt, Birmingham, electro-plate manufacturer.

NOTICES OF DIVIDENDS.

*In London.*—H. J. Van Dieren, High Holborn and Brighton, jeweller, 4¾d., first and final; January, F. G. Clark, Brighton.

*In the Country.*—C. W. Hurt (trading as Hurt & Son), Birmingham, watchmaker, 1s. 1d., first and final; December 15, or any subsequent Thursday, Fisher & Randle, Birmingham. T. Marson (trading as T. Marson & Co.), Birmingham, jeweller, first; December 28, 25, Colmore Row, Birmingham. A. Wilcox, Birmingham, manufacturing jeweller, 13s., first; September 8, 120, Colmore Row, Birmingham. J. Lee, Manchester, 1¼d., second and final; Decebmer 21, J. Eckersley, Manchester. W. Snook, Southsea, watchmaker, 6d., first and final; December 30, 166, Queen Street, Portsea. E. Welbourn, Ilkley, jeweller, 1s. 6½d., first and final; Dec. 28, Official Receiver, Wakefield.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

16,008. G. D. MacDougald, Dundee, for "Improvements in apparatus for the driving and controlling of clocks." Dated November 27, 1887.

16,027. C. E. Tripler, London, for "Improvement for amalgamating and separating precious metals from powdered ore or earth." (Complete specification.) Dated November 22, 1887.

16,051. M. V. B. Ethridge, H. E. Waite and J. Swann, London, for "Improvements in timepieces." Dated November 22, 1887.

16,074 W. Jeannot, London, for "Improvements in chronographs or stop watches." Dated November 22, 1887.

16,079. T. James, London, for "A time indicator." Dated November 23, 1887.

16,126. J. Friedberger, C. Hammer, F. F. Mack, A. Bucher, and M. Häderer, London, for "An Improved safety fastening or brooch." Dated November 23, 1887.

16,138. F. V. Hawley, London, for "Prevention of watches being stolen, viz.: the patent automatic swivel." Dated November 24, 1887.

16,183. J. B. Spence, London, for "Improvements in the treatment of ores containing gold for the purpose of extracting the gold therefrom." Dated November 24, 1887.

16,192. P. J. Ogle, London, for "An improved arrangement of the amalgamated plates employed in the treatment of gold ores, in supports for the same, and in apparatus connected therewith." Dated November 24, 1887.

16,270. H. Hutchinson, London, for "Improvements in the treatment of refractory gold and silver ores." Dated November 26, 1887.

16,313. W. S. Leete, London, for "Securing the bows of keyless watches." Dated November 28, 1887.

16,333. A. B. O'Connor and G. W. Butterfield, London, for "A mechanical appliance adjustable for clocks, watches, locks, railway switches, electric lights, gas lights, and other machinery requiring regular periodic application of power for adjustment." Dated November 28, 1887.

16,401. T. B. Sharp, Staffordshire, for "Improvements in attaching stones, jewels or ornaments to finger rings and other rings." Dated November 29, 1887.

16,414. P. H. Lawrence and F. L. Turner, London, for "Improvements in or relating to centre seconds stop watches." Dated November 29, 1887.

16,468. W. H. Lord, Birmingham, for "Improvements in watch chains." (Complete specification.) Dated November 30, 1887.

16,503. M. Myers and J. Lowe, Birmingham, for "Improvements in combined spring clips and hooks or devices for holding watches, jewellery and other articles and descriptive tickets of the same." Dated December 1, 1887.

16,518. R. F. Dorendorff, London, for "A bracelet, garter and napkin ring cord." Dated December 1, 1887.

16,553. A. Schanschieff and D. Marks, London, for "Improvements in extracting gold, silver and other metals from their ores and alloys." Dated December 1, 1887.

16,564. W. Leuchars, London, for "Improvements in bracelets, girdles or bangles." Dated December 2, 1887.

16,611. E. De Pars, a communication from Kuhn and Tièche, Switzerland, for "Improvements in keyless watches." Dated December 2, 1887.

16,639. E. L. Downing, London, for "Improvements in joints and catches for the pins of brooches, shawl pins and the like." Dated December 3, 1887.

16,838. J. Kendal, London, for "Improvements in watch keys for winding any size watch." Dated December 7, 1887.

16,926. T. Fenwick, London, for "Improvements in the electro-deposition of metals." Dated December 8, 1887,

17,033. A. Parkes, London, for "Improvements in the extraction of gold and silver from ores or compounds containing the same, and in solvents for such metals." Dated December 10, 1887.

17,037. W. Robinson, London, for "Improvements in ingot moulds." Dated December 10, 1887.

17,129. H. East and F. Llewellyn Turner, Birmingham, for "Improvements in securing watch-bows to the pendants of keyless and other watches." Dated December 13, 1887.

17,316. H. Aitken, Glasgow, for "Improvements in treating ores containing gold and other metals." Dated December 16, 1887.

## Recent American Patents.

| | | |
|---|---|---|
| Buttons, Machine for making Collar. | G. Krementz | 372,683 |
| Button or Stud. | G. E. Adams | 373,041 |
| Button, Spring Cuff. | E. K. Haynes | 373,401 |
| Button, Stud, Locket or other article of Jewellery. | L. B. Byrne | 373,514 |
| Casting Steel Wheels, Metal Mould for. | W. Sellers | 372,336 |
| Chain Hook, Watch. | H. M. Herring | 372,675 |
| Chuck, Lathe. | C. R. Mead | 372,482 |
| Clock. | W. D. Chase | 373,441 |
| Clock, Calendar. | J. A. Shimp | 372,575 |
| Clock Dial. | A. Staubitz | 372,642 |
| Clock, Pendulum. | H. O. Deuss | 373,727 |
| Clock Striking Mechanism. | Ethridge & Waite | 373,771 |
| Clocks, Chiming Apparatus for. | J. Harrington | 372,849 |
| Cuff Holder. | H. C. Frank | 373,556 |
| Eyeglasses. | C. H. Farley | 373,349—373,350 |
| Jewel Case. | Valfer & Weil | 372,345 |
| Metal, Device for Clamping Sheets of. | S. McCarter | 373,672 |
| Metal Shears. | W. J. Bavrer | 372,784—372,785 |
| Micrometer Gauge. | J. P. B. Wells | 373,705 |
| Screw Cutting Machine. | T. B. Smith | 372,434 |
| Screw Cutting Tool. | J. C. Williams | 372,504 |
| Screw Tap. | L. D. Castle | 373,270 |
| Sheet Metal Shearing Machine. | C. Wais | 373,038 |
| Spectacles. | C. B. Bishop | 372,954 |
| Spectacle Temple. | W. J. Suttie | 372,437 |
| Spectacle Temple. | R. Bradley, Jun. | 373,006 |
| Steel, Welding. | W. B. Middleton | 372,696 |
| Thermometer, Recording. | W. F. Brewster | 373,719 |
| Watch Case. | E. C. Chappatte | 373,011 |
| Watch Case. | E. C. Chappatte | 373,723 |
| Watch Case. | E. Heffernan | 373,364 |
| Watch Case. | W. K. Kennedy | 372,540 |
| Watch Case. | C. F. Morrill | 372,558 |
| Watch Pendant. | W. S. Richardson | 372,868 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Correspondence.

*All Letters for Publication to be addressed to the* EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

SIR,—Can any of your readers tell me whether I must take out a license to go round the country to sell jewellery, &c., and to get work?

"COUNTRY WATCHMAKER."

## Answers to Correspondents.

SIR,—Your correspondent, ANXIOUS, asks for an explanation "of the best method of extracting broken cylinder plugs from very small cylinders."

The best way to extract plugs from any sized cylinders is to punch them out on a riveting stake—which should not be made of hardened steel but of brass—the holes of which stake should be broached with a taper broach from the under side; and the holes should not be chamfered from the top side (a chamfered

hole might be used to start the plug, but that is not necessary if the cylinder is placed over the hole in the stake). The punch used should be in the shape of a crank; the point or pivot of the crank to be very short and the crank of sufficient length and divergence from the centre to be free of the body of the cylinder and the boss of the balance when the punch is used to remove the bottom plug of the cylinder.

One would think that any person who could work in a cylinder might, with very little thought and trouble, *invent* and make such a tool (the shape is so obvious and the trouble so little) and thus help themselves, without having recourse to the German tool makers for every trifle required by the watch jobber, even to the making of a drill.

If beginners and apprentices would spend a little of their spare time in thinking out and making small tools and appliances for various purposes, they would help themselves out of many difficulties, and save a wonderful amount of the time they lose in evoking others to help them.

W. H.

## Buyers' Guide.

**The Sheffield Smelting Company,** Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

**Jones, E. A.,** Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

**W. Scott Hayward & Co.,** 59, Deansgate, and Barton Arcade, Manchester. Wholesale Jet Ornament Manufacturers, Jet Cameo Cutters and Rough Jet Merchants. Approval parcels sent on receipt of order, if accompanied with trade references. Repairs and matchings executed on the day received. Works: Manchester and Whitby. Agents at Liverpool, Leipzig and Paris.

**For cheap, quick, reliable Watch and Jewellery Repairs,** by the most Experienced Workmen, send to ALEXANDER EDWARDS, Watch Material and Tool Dealer, 88 & 89, Craven Street, and 2, Holyhead Road, Coventry. Lists: all Horological Literature.

## WANTED.

ITALY.—A FIRST-RATE MERCANTILE FIRM, travelling regularly over the whole peninsula—Sicily, Malta and Tunis—with large experience and extensive connections in the Jewellery, Watch and Clock line, is open to enter into correspondence with some Important Manufacturer for the Sale of their Goods in the above quarters. References of the highest standing.—Please address, A. A., 110, Naples.—[ADVT.]

## TO BE SOLD.

WATCHMAKER'S, JEWELLER'S and SILVERSMITH'S BUSINESS.—Established over 100 years in good Agricultural and Training Districts. Stock moderate, and can be reduced.—For particulars, apply to Mrs. J. STANILAND, Malton, Yorks. [ADVT.]

WATCH MANUFACTURING BUSINESS, for sale of Superior Goods only; established 35 years, with good Jobbing Trade attached, extending over England, Scotland, Ireland and Wales. Incoming can be reduced to Two or Three Hundred Pounds, chiefly or quite covered by goods, comprising movements, material, tools, &c. Owner no objection to remain two or three years to part work at finishing or assist in any wayrequired. Age only reason for wishing to decline business.—Address MANUFACTURER, Office of this Journal.—[ADVT.]

WATCHMAKER'S and JEWELLER'S BUSINESS for sale, situated in the centre of a good manufacturing town. Stock, Fixtures and Fittings, about £500.—Apply, W., Office of this Journal, 7, St. Paul's Churchyard, London.—[ADVT.]

FOR SALE, at once, WATCHMAKER'S BUSINESS in capital position, doing splendid trade; genuine good opportunity rarely to be met with; death cause of selling. All particulars given. W. DAWSON, Bridge Street, Bradford.—[ADVT.]

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

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CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to

THE WATCHMAKER, JEWELLER & SILVERSMITH,
7, ST. PAUL'S CHURCHYARD,
LONDON, E.C.

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

BY the kindness of Mr. Walter S. Prideaux, Clerk to the Worshipful Company of Goldsmiths, we are enabled to give on another page the full text of the new regulations of the Swiss Federal Council affecting the Hall-marking of Swiss watches intended for the English market.

While the choice of English or Swiss marks in the cases is still arbitrary, the promptitude with which their government have accepted the challenge tacitly embodied in what may be termed the watchmaking clauses of the Merchandise Marks Act, affords a clear proof, if any were wanting, of the determination of Swiss manufacturers to trade honestly on their merits.

Should the great majority of makers, as is not unlikely, elect to adopt the latter marks, a good opportunity will be afforded for testing the estimation in which the productions of the two countries are, respectively, to be held in the home and (shortly, it is to be hoped) colonial markets. The much talked of "two-edged sword" will then have an opportunity to develop its back-cutting properties. As it is, English makers are just now very confident of being able to hold their own in fair competition with all comers, and the new rules referred to (which a careful consideration of will show are very precise) should do much to promote a good understanding among the trade, as they are calculated by the removal of vexatious anomalies to beneficially affect honest traders.

As we have before said (in previous remarks upon the subject of Hall-marking) the Swiss Government assay is quite as severe a test as those of our own Halls, and it was only required (in order that the mark should be an equally reliable guarantee of the quality of the case) that a rule be introduced such as that comprised in the second *decree* which makes obligatory the assaying of the case as a whole.

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ON another page will be found the report of the first case directly affecting jewellers heard under the Merchandise Marks Act. As the decision arrived at is likely to be of great importance to the trade, we recommend a careful perusal of the stipendiary's judgment. Pending an appeal being taken, however, we shall reserve our comments on the subject.

# General Notes.

THE Queen's Jubilee presents have been removed from Windsor Castle to the Bethnal Green Museum, where they will be on view until further notice, for the benefit of residents at the East End.

THE annual dinner of the Foreign Watch and Clockmakers' Society took place on January 7 at the Holborn Restaurant. The report which was submitted by the Secretary showed the Society to be in a flourishing condition, there being 112 members on the books, and the balance sheet showing a total profit for the year of over £98.

THE Director of the United States Mint has estimated the values of the standard coins of the various nations of the world, to be proclaimed by the Secretary of the Treasury on January 1. The valuation of the silver coins has been reckoned according to the price of silver in London during the three months ending December 24. Accordingly the value of the Mexican silver dollar is 75·9 to 79 cents.

THE methods of production of jewellery work at Pforzheim, in Baden, says *Scientific News*, are very similar to those in the United States, except that the German has the advantage of being provided with a very excellent technical school, or *Gewerbe schule*, in which children intended for employment in the jewellery shops receive a thorough theoretical training long before they see the inside of a factory. Instruction here is practically free, the manufacturers paying about 8*s*. a year for the pupils whom they intend to employ.

A REMARKABLE instance of close adjustment for temperature compensation has just come under our notice in a watch sprung by Mr. J. F. Cole. The watch, which is a minute chronograph by Mr. C. H. Golay, has gained an "A" certificate with a total of 81·7 marks; the mean change of daily rate for 1° Fahr. was 0·002 seconds, and the number of marks awarded for temperature compensation is 19·9 out of a possible 20. The total number of marks would have been much greater but for its partial failure in one of the "quarter" positions.

M. DE FREYCINET *(Comptes Rendus)* proposes the following New Units of Length, &c., in place of those of the metric system; the unit of length is the length of the velocity acquired at the end of a second of mean time by a body falling freely in a vacuum at Paris. This unit will be 0·98 metre. The unit of volume is a cube of which the side is $\frac{1}{100}$ of the unit of length. The unit of mass is the mass of water at 4·1°C. contained in the unit of volume. The unit of weight is the weight of the unit of mass. The unit of force = the unit of weight.

THE Council of the Manchester Technical School have recently purchased a valuable collection of apparatus, of German manufacture, illustrative of the principles of mechanism, and of sound, light, and chemistry in their technical applications. They have also made arrangements for a course of twelve lectures on "Chemical Engineering," to be delivered by Mr. G. E. Davis, late Government Inspector of Alkali Works. This school enjoys considerable prosperity, and is at present attended by 2,304 students, as compared with 2,136 at this time last year.

AN electrically-wound clock has been patented by Mr. W. J. Barnsdale, of Brunswick Place, City Road. According to this invention electrical contact points or springs are placed with relation to the centre wheel, and a corresponding pin wheel driven thereby or acting in unison therewith. The winding is effected by means of the revolving armature of an electro-motor, which acts upon suitable wheel trains in connection with the mechanism, but such motor is only actuated when the circuits are completed through the contact points, and ceases to act so soon as such circuit is broken.

A COMPANY called the Platinum Plating Co. (Limited) has been formed to buy up the patent rights of this form of electro-plating and to carry out the process in the British Empire (Canada excepted). The capital is £60,000, in 59,100 ordinary and 900 founders' shares, and the former are now offered to the public.

AN improvement in the manufacture of aluminum is the subject of a patent of Mr. Edward Cleavers, of Stockwell, Surrey. This is effected by baking alumina and dissolving it in sulphuric acid. The sulphate of alumina thus obtained is mixed with finely-divided carbon, which when dry is heated out of contact with air, thereby causing a reduction of the alumina salt. The material so obtained is mixed with iron in a divided state, and the temperature raised sufficiently to melt the metal, when an alloy of aluminum and iron is obtained.

THE Rev. Harry Mitchell, in the *Prescot Parish Magazine*, says:—One subject now uppermost in the minds of many of you is, I know, the proposed watch factory. It is a matter of life or death to the staple trade of Prescot; for, owing to the rapid introduction of new methods in the manufacture of watches, we must either accommodate ourselves to the change, and take the lead in England, or see the whole of the present trade gradually drift away to more enterprising centres. The sudden death of Mr. W. L. Evans was a crushing blow to the company. He had just been appointed its chairman, with Mr. Pilkington, of The Hazels, and Mr. Willis, of Halsnead, as directors; and, had he lived, I have little doubt but that by this time we might have been getting ready to lay the foundation stone of the factory. We have not yet succeeded in finding another chairman, and nothing more can be done until a report shall have been made to the Company by two gentlemen who have been commissioned to make full inquiry into the conditions of the trade both at home and abroad.

THE Society for Promoting Industrial Villages is circulating in printed form Mr. Cookworthy Robins's important lecture on the depreciation of landed property, and its ultimate recovery. The report of the discussion thereon is appended, and accompanied by a special New Year's appeal to those who may feel disposed to co-operate in the movement. The Council believe that favourable opportunities now exist for the establishment of village industries side by side with agricultural operations; and they invite assistance by granting the use of drawing-rooms for private meetings, with a view to form Village Branches or Ladies' Auxiliaries, and by keeping the Society informed of opportunities for action. The writing and compiling of practical handbooks on simple inexpensive village industries is also considered a valuable aid. Among these the Council class candying and preserving fruits, bee-keeping, poultry and rabbit farming; culture of fruits, tomatoes, and fine vegetables; flax growing, spinning and hand-loom weaving, rope-net and twine making, lace, glove and embroidery making, straw and shaving plaiting, basket and chair making and mending, small metal embossing, working, and wire-net making. The Hon. Secretary of the Society is Mr. G. J. Knight, 32, Craven Street.

THE DIAMOND MARKET.—The *Amsterdam* market is just waking up after the holidays, during which hardly any business was done, and only Russian and Polish buyers were on hand to take advantage of the low state of the market. Factories are again fully going.

At *Paris*, merchants are inclined to speculate for stock, but at present are offering impossible prices.

The steamers "Athenian," "Grantully Castle," "Trojan," "Norham Castle" and "Mexican" arrived since our last report, and although quotations have been somewhat higher, a good deal of business has been done at normal prices owing to the large quantity of stuff in the *London* market.

From *Kimberley* latest advices report a very active market and Companies' parcels in good demand. The news from home good, the shipments realising a profit of from two to three per cent.

SILVER.—Bars 44¼d. per oz.

## Trade Notes.

At the recent Apprentices' Exhibition at the People's Palace, Mile End, two of the apprentices of Messrs. Botwright & Grey, of 13, Spencer Street, E.C., were awarded medals for excellence of workmanship.

Messrs. C. Westwood & Sons, of Hall Street, Birmingham, inform us that they are now making the small punches for marking watch cases with the word SWISS, as required by the recent Act of Parliament.

Mr. T. P. Hewitt and a commercial expert sailed for America on the 14th ultimo, with a view to obtain information on which to frame a prospectus for the proposed Prescot Watch Company.

A new set of chimes, for performances of Wagner's "Parsifal," has been manufactured by Mr. John Harrington, of Coventry. Madame Wagner has pronounced them entirely satisfactory, and they will, according to the *Athenæum*, be used at the performances in July and August next.

Mr. E. Barnard, of Cirencester, has patented an opsiometer. He describes it as an instrument whereby lenses, fixed at a normal reading distance from printed matter, shall, by means of a disc, cylinder, or other means, be made to revolve before both eyes of a person who looks through two eye openings (shaped something like an opera-glass), who thus readily ascertains the power of lens required in selecting a pair of spectacles, &c.

"The Merchandise Marks Act, 1887, together with the Orders in Council in Regard to the Marking of Foreign Watch Cases," is the title of a pamphlet issued by Mr. George D. Ham. It contains the full text of the recent Act, with the Customs regulations in regard to the importation of goods bearing trade or descriptive marks, with notes by the author. It is published by Effingham Wilson, 11, Royal Exchange Buildings, E.C.

Under the failure of Jacob Otto Schuler, of 12, Hatton Garden, goldsmith, accounts have been furnished, accompanied by the official receiver's observations. The aggregate liabilities are put down at £44,837, of which £33,420 are expected to rank, and assets estimated at £5,690. The debtor states that he commenced business in partnership with another person in January, 1874; that his partner retired about the end of 1875, and the debtor continued the business, having a capital of about £1,600 at the time. He further states that in 1881 he became part proprietor of the Spitzkop Gold Mine in the Transvaal, and that since 1885 he has received therefrom and paid into the business about £10,000. He attributes his failure to bad debts and a large falling off in his trade since the beginning of 1887. The official receiver observes that the books of accounts appear to have been well and properly kept and balanced. The debtor has been adjudged bankrupt.

Although a simple means for demagnetising watches has long been a desideratum in the trade, and, as exposing such, the article we publish in this issue is a very valuable contribution to what is known on the subject, seeing that almost every watch in use is liable at some time or other to be affected, still it is obviously beginning at the wrong end to aim only at curing what can be prevented. The increasing dangers to watches accruing from the extensive employment of dynamos and electrical appliances of all kinds in the manufactures, has of late very seriously exercised both wearers and makers. It is therefore with satisfaction we call attention to the new advertisement, appearing on another page, of Messrs. Baume & Co.'s anti-magnetic Longines watches. The reputation of the ordinary Longines lever is so well established that anything we could say with regard to it is rendered unnecessary. The addition of the non-magnetic parts will doubtless cause these watches to become still more popular with the trade.

It has been frequently found that complicated watches having numerous steel parts in action become magnetised, and this, in the case of repeaters, has undoubtedly originated in the percussion of the hammers on the gongs. With a view to obviate this source of error, Mr. H. Golay, of 46, Myddelton Square, E.C., has introduced a gong composed of a new non-magnetisable alloy. The new gong has all the properties of the steel ones, having a rich, mellow tone, and, besides, has the advantages of neither rusting nor tarnishing.

If the past year of Jubilee was disappointing in its results to many manufacturers, it is quite certain that our turret clock makers cannot be included in the category. The old-established firm of W. F. Evans & Sons, of Handsworth, near Birmingham, were exceptionally fortunate, and, among many other orders completed during the year, sent out large Jubilee clocks to Yorkshire, Lancashire, Gloucestershire and London; large chime clocks to Liverpool and Freemantle town halls; and, as instancing the general prosperity of the trade, this firm finished fifty lever escapement clocks during the last quarter of the year for South America, in one order.

## The Merchandise Marks Act and the Jewellery Trade.

The first case under the above Act affecting jewellers was heard at Birmingham on the 5th ult., when Mr. Alfred Peel, a jeweller, was summoned for having, as alleged, falsely described a quantity of silver goods supplied to Mr. Albert Heymann, of the firm of Messrs. Sachs & Co., Birmingham and Berlin. The goods were invoiced as "800 in 1,000," meaning that in every 1,000 parts there were 800 parts of silver. The complainant had the goods assayed, with the result that the highest point reached amongst the various articles was 746 in the 1,000. The defendant pleaded that he ordered the goods to be made of 800 silver, and when he invoiced them believed them to be as described. After hearing arguments from both sides, the stipendiary, Mr. Kynnersley, reserved judgment for a week.

On Tuesday, 10th ult., the stipendiary magistrate gave his decision in the above case.

The judgment was given in writing, and was as follows:—"Section 2 of the Act states (1) that 'Every person who (a) applies any false trade description to goods' shall be subject to the provisions of this Act, and unless he proves that he acted without intent to defraud, be guilty of an offence against this Act. (2) Every person who sells any goods or things to which a false trade description is applied shall, unless he proves (b) that on demand made by or on behalf of the prosecution, he gave all the information in his power with respect to the persons from whom he obtained the goods or things; or (c) that otherwise he had acted innocently—be guilty of an offence against the Act.' By Section 3 the expression 'trade description' means any description, statement, or other indication, direct or indirect; (a) 'as to the material of which any goods are composed, and the use of any figures, word, or mark, which, according to the custom of the trade, is commonly taken to be an indication of any of the above matters, shall be deemed to be a trade description within the meaning of the Act.' The expression 'false trade description' means a trade description which is false in a material respect as regards the goods to which it is applied, and includes every alteration of a trade description, whether by way of addition, effacement, or otherwise, where that alteration makes the description false in a material respect. By Section 5 a person shall be deemed to apply a trade description who (a) uses it in any manner calculated to lead to the belief that the goods in connection with which it is used, are designated by that trade description. A trade description shall be deemed to be applied whether it is woven, impressed, or otherwise worked into or annexed or affixed to the goods, or to any covering, label, reel, or other thing." After briefly recapitulating the facts of the

case, as given above, the stipendiary proceeded to say:—"The questions that arise are (1) Did the defendant apply a false trade description by sending with the goods in the way mentioned the invoice which described the goods as '800-1,000 silver?' (2) Was it a trade description? (3) Was it a false trade description? I am of opinion that a false trade description was applied. The invoice was applied to the goods or covering, and was used in a manner calculated to lead to the belief that the goods were designated by the trade description mentioned in the invoice. I find as a fact '800-1,000' was a trade description well understood in the jewellery trade. I also find that it was false in a 'material respect' as regards the quality of the goods to which it was applied. The defendant not having proved that he acted without intent to defraud—in fact, he admitted he knew of the false description as to quality—I must, therefore, convict him of applying the false trade description; and, not having proved that he acted innocently, I must convict him of unlawfully selling the goods. As this is the first prosecution under the Act in Birmingham, I shall impose a nominal fine of 20s. in each case, and shall be glad to grant a case for the opinion of the High Court."

Mr. Hugo Young: What about the summons for December 14? I have heard nothing about that case.

Mr. Barradale (magistrates' clerk): I understand Mr. Kynnersley that that is dismissed.

Mr. Hugo Young said that the defendant would certainly appeal. On consideration he thought that the Quarter Sessions would be the best tribunal to deal with the case.

Mr. Alfred Young applied for costs for the complainant.

Mr. Hugo Young objected, remarking that two summonses had been withdrawn and another had been dismissed. The defendant had been willing to meet all the cases on their merits.

Mr. Barradale said that the last case was clearly investigated.

The Stipendiary allowed the complainant four guineas costs, and said that if he heard from Mr. Hugo Young within a week he would grant an appeal.

## Further Facilities for the Insurance of Watches and Jewellery.

THE Postmaster-General has issued the following notice:—With the view of affording further facilities for the transmission by Registered Letter Post of watches, jewellery and other small articles of value, the fee of 1d. for the Insurance up to £5 of a Registered Letter will, on and after the 15th instant, be discontinued.

Thenceforward, except in the case of Letters containing coin, compensation for loss or damage to an amount not exceeding £5 will be given without payment of any Insurance Fee, provided that the Registration Fee of 2d. and the Postage at the ordinary Inland rate have been prepaid. In the case of letters containing coin, compensation will still be given up to £2.

Thus, without payment of an Insurance Fee, compensation up to an amount not exceeding £5 will be given in respect of a Registered Letter.

The average weight of a watch-packet is from 4 to 6 ozs., and that of a packet containing jewellery is probably somewhat less. The charge for such packets will therefore be as follows:—

| | | |
|---|---|---|
| If the weight do not exceed 2 ozs.— | Postage | 1½d. |
| | Registration Fee | 2d. |
| | | 3½d. |
| If the weight do not exceed 4 ozs.— | Postage | 2d. |
| | Registration Fee | 2d. |
| | | 4d. |
| If the weight do not exceed 6 ozs.— | Postage | 2½d. |
| | Registration Fee | 2d. |
| | | 4½d. |

And so on, at the rate of ½d. for every additional 2 ozs.

When a Registered Letter is posted a certificate of posting is always given, and when it is delivered a receipt is always taken.

The arrangement under which for a fee of 2d. compensation will be given for loss or damage to an amount not exceeding £10 will continue, and, except as altered by this Notice, the existing rules as to compensation for loss and damage of Registered Letters will remain in force.

The public are reminded that to secure compensation for damage, Registered Letters must be securely packed, and the words "*Fragile, with Care*" must appear on the cover in bold and legible characters. These words should, when possible, be inserted above the address. "Inland Parcel Post—Watches and Jewellery."

In view of the foregoing regulations, all Packets containing Watches or Jewellery should be sent by the Registered Letter Post, and after the 15th instant the Insurance of such articles by Parcel Post will cease, and compensation in respect thereof will thenceforth in no case be paid.

## Birmingham News.

From Our Correspondent.

MANUFACTURERS in the fancy trades generally report a very quiet trade during January; the new year has not opened with a "grand flourish of trumpets" as it did last year, when the prospects of the Jubilee caused a considerable stir of a speculative character, but we are all hoping that there will be a much firmer tone, taking the year through, than there was last, as some of the staple trades are picking up nicely.

* * *

The New Merchandise Marks Act is of course a much discussed subject; the recent litigation between two Birmingham houses having brought it before the public in a rather forcible manner, some manufacturers declaring "that if the recent decision is confirmed they may as well shut up, as it is impossible to make work without solder;" others thinking that the Act will be productive of great good and impart a better tone to the jewellery trade. There is no doubt that at present it is causing a considerable stir in the trade as to the probability of some fancy trade marks holding good, and no doubt that there is a certain amount of holding back orders in consequence; and yet in the face of all this there are a number of manufacturers who will not take the trouble to read the Act, and in point of fact quite ignore it, and excuse themselves as I heard one the other day, by saying, "We do not represent goods to be what they are not, and therefore it does not apply to us." But it appears to me that the great question is, of what does a misrepresentation consist? I dont think the lawyers quite settled it the other week—at any rate not to the satisfaction of the practical jeweller.

* * *

One of the oldest, and at one time one of the largest manufacturing jewellers, (Messrs. J. & W. Randall, Vittoria Street, Birmingham) have, during the last month, finally withdrawn from the trade. The fixtures, dies, tools, &c. have been sold by auction, and the business premises are in the market and are vacant. As the premises are one of the largest in the trade there will be difficulty in disposing of them as a whole, and they will no doubt be eventually divided up as the best way of utilising them. I think as a rule, that such extensive buildings for the jewellery trade is a mistake, as the jeweller is, or should be, an artist, and it is practically impossible to carry on a huge business that will occupy premises on such an imposing scale. There are a few instances of jewellers—so called—occupying premises containing 200 workmen or thereabouts; but they are scarcely jewellers proper, making as they do a variety of fancy articles which would better come under the head of light brass foundry.

* * *

There are still a number of jewellers working short time, while on the other hand there are a few that are pushed for work, and are adding to their number of hands.

## The Demagnetising of Watches.

IN an interesting article on the above subject in *Scientific News*, the writer states that it is only when a watch becomes magnetised as a whole that harm is done.

Several different methods of demagnetisation have been devised, but none of them is so certain as the separate demagnetisation of each part. In carrying out this remedy, there are two conditions of neutrality, both of which can rarely be attained. The one is to make the part under treatment unable to pick up the smallest iron filing, and the other is to leave it so that it will not affect a compass-needle more than a piece of soft iron, which would feebly attract either pole. It is as a rule better to aim at the first of these conditions, unless, which is not likely, it should, when almost perfect in this respect, exert considerable influence on the compass.

The easiest method of demagnetising the separate pieces is, after carefully examining how it is magnetised, both by the compass and by iron filings, to oppose its magnetism by bringing an ordinary horseshoe magnet near it. A large magnet held at a few inches distance is better than actually stroking the part with a magnetised sewing needle, as the magnetisation of the latter is more liable to be altered than that of a large magnet. In some complicated parts, such as a compensated balance, it is necessary to use a needle. Balances have been constructed by M. Paillard of two different alloys of palladium having different expansive qualities. Phosphor bronze is used for levers, and might be used in conjunction with platinum for balances.

The balance is the most important part, for a watch provided with a non-magnetisable balance, though having spring, lever, regulator arm and escape wheel of steel, will keep fairly good time after having been subjected to the influence of a powerful magnet, although it has been temporarily stopped while in the magnetic field.

To test a piece, such as a lever, with a compass, it is sufficient to offer first one end and then the other to the needle, holding it at right angles and at a fixed distance. The needle should be attracted by either end, but should it be magnetised, one end will attract the needle, and the other end repel it, or only attract it feebly.

Sometimes the magnetism is destroyed by heating each part to dull redness, and re-tempering and polishing. Such a method cannot be recommended, as it not only involves considerably more labour, but is likely to do more harm to the watch than a little residual magnetism.

It is probable that the separate parts could be completely demagnetised by placing them one by one in the centre of a bobbin of insulated wire, like a small induction coil, but wound with rather thicker wire. A current should be sent through the coil, and rapidly alternated by means of a commutator, the strength of the current being at the same time gradually diminished by introducing a resistance. The piece under treatment would be magnetised first one way, and then the other, but with gradually decreasing strength. This method has been applied in various ways, with some success, to the demagnetisation of a watch as a whole, without taking it to pieces. It has the merit of simplicity, and does not need any knowledge of watch-making. The simplest way of carrying it out is to spin the watch rapidly, near a dynamo or powerful magnet, and withdraw it while spinning. This is almost always enough to start a watch which has been stopped, but its rate will probably remain affected. Mr. Maxim has constructed an instrument for the purpose; it consists of a magnet which can be rotated so as to present the north and south poles in succession, and a holder for the watch. This holder is attached to a long screw, and during the rotation of the magnet, the watch is gradually withdrawn from its influence. A similar arrangement has been used with an electro magnet, and provision is made for gradually reducing the strength of the current. These methods are free from the risk of injury which might occur from the violent spinning, but a very strong magnet would be required to destroy the effect of bringing a watch nearly into contact with the pole piece of a dynamo, an event which may often happen while it remains in the pocket.

There is one other method of treating the watch as a whole. It is placed on a table, face upwards, on a sheet of paper with two lines crossing at right angles. The dial is placed so that XII and VI are just over one line, and III and IX are over the other. The deflection of the compass is noted, and the watch is turned so as to bring I and VII over one line, and IIII and X over the other. The deflection is again noted, and a table made for the strength of the magnetism in each position. The maximum and minimum, or north and south points, can then be determined, and the watch is removed and passed backwards and forwards in front of a strong magnet in such a way as to neutralise the magnetism which has thus been measured. It must then be replaced and a fresh exploration made, and the process may be repeated until the compass fails to detect any unusual distribution of magnetism. Although good results are recorded as having been effected by this means, it can hardly be expected to cure effectually, unless in experienced hands, and it must be a tedious operation.

A complete protection from magnetisation is afforded by an iron case. It is not necessary that it should completely encase the watch, but it may consist merely of a piece of tinned iron, bent over with the corners rounded. The effect is to offer an easy passage to the magnetic lines of force, which will then pass round, instead of through the watch.

## Exhibition of Japanese Art.

A LOAN Exhibition of Japanese Art, forming by far the most important collection of the kind that has yet been seen in England, was opened last month at the galleries of the Fine Art Society, 148, New Bond Street. It contains some of the choicest specimens of lacquer, metal work, porcelain and pottery, wood and ivory carvings, enamels, bronzes and embroideries that have been brought into the country, and both Mr. Huish, the able director of the society, and Mr. Kataoka, whose reputation as an expert is a sufficient guarantee for the value of his services in anything connected with the art of his country, have been occupied for upwards of two months in the work of selecting, cataloguing and doing their best to make the most of the space at disposal. The gallery leading to the two principal exhibition rooms has been tastefully decorated and furnished for the occasion by Mr. G. Faulkner Armitage, of Altrincham, in well-harmonised tones of red, brown and russet. Although many of the exhibits, especially the smaller objects, are necessarily somewhat crowded, being packed in as many cases as there are letters in the alphabet, they are so classified and arranged that it is easy to study and compare them without fatigue. In the catalogue, temporarily provided by Mr. Kataoka while a more exhaustive illustrated volume is in the press, will be found an interesting introductory note, to which we may refer our readers for special and technical information on the various branches of work exhibited. Here we may make acquaintance with the great "old masters" of the Land of the Rising Sun, and if their names are not destined to become household words like those of their illustrious contemporaries in art in Italy, Holland, France and other European countries, they must at least be revered in the abstract for the relics of patience, ingenuity and taste which they have left behind. Many of them were highly esteemed in their day, and held Court appointments and titles of honour. Until 30 years ago, Japan, as far as its art-wealth was concerned, was to the Englishman an unexplored country; but so many treasures have accumulated over here since that time, and are so highly prized for their beauty, that collectors are ready to pay fabulous sums for choice pieces of lacquer and ivory carvings. Amongst the principal contributors to the Exhibition are the Duke of Edinburgh, Mr. G. Salting, Mr. Seymour Trower, Mr. Marcus Huish, Mr. Ernest Hart, Mr. W. J. Stuart, Mr. Cyril Flower, Mrs. Ahrens, Mr. E. Gilbertson, Sir Frederick Leighton, M. Bing, Sir Trevor Lawrence, Lieut.-Col. Alt, Mr. Phené Spiers, Mr. W. C. Alexander, Mr. Massey Mainwaring, Mr. F. Y. Edwards and Dr. Anderson. There are upwards of 2,000 objects on view, and days might be spent in studying them before any adequate idea could be formed of the wealth of art produced in a country where patience and skill are so wonderfully combined.

# American Items.

THE Trenton Watch Company are said to be turning out 200 complete watches a day, and are selling them as fast as they can make them. They are only waiting for some new pinion cutting machines to largely increase their output. The cases are now made with a hinged bezel, which is a great improvement.

ACCORDING to the "*Jewelry News*" the watch industry must be in a flourishing condition, in spite of spasmodic rumors of over-production. Plans for the formation of new factories are discussed, and capital for investment in such enterprises is not wanting. Several parties are said to be prospecting for the location of sites for the building of such factories: both for the manufacture of cheap and for the better grade of watches.

LAMENTING the disadvantage under which American diamond cutters are placed owing to foreign competition, the same organ expresses regret, that an increase of duty on cut diamonds is not practicable, because it furnishes greater temptations to smugglers. The smuggling of diamonds is carried on successfully to a greater or less extent: and one of the reasons for imposing a low duty on the importation of diamonds is to remove the temptation to smuggling.

THE death took place on the 2nd ult., at Boston, Massachusetts, of Mr. Henry Dutton Morse, who was well known in the trade as the first American diamond cutter. By the aid of a machine of his own invention he cut the first diamond ever cut in America. It was known as the "Dewey" diamond, and weighed in the rough about 50 carats. Subsequently he cut the large diamond known as the "Tiffany No 2," which was described by Mr. George F. Kunz in our November issue. Mr. Morse was in his 62nd year at the time of his death.

THE recent rise in copper, says the *Manufacturing Jeweler*, Prov., R.I., has been so extraordinary, and it affects our jewellers so materially, that a word here may not be out of place. Chili bars are used as a basis for speculation, and London is the leading market of the world for these bars. When Chili bars go up in London, American copper rises in New York, and *vice versa*. A syndicate formed in Paris had been so successful in forcing up the price of tin, increasing the price from twenty to thirty-two cents a pound in two months, that they conceived the idea of cornering copper in the same way. They have been very successful also in this latest effort. On October 20, Chili bars were selling for £36 a ton in London. The syndicate bought all the visible supply in England and on the 27th of December the price was £85 a ton. As if to aid the bull movement of this syndicate, the Calumet and Hecla mine, the leading mine of the Lake Superior district, caught on fire, and this seems certain materially to decrease the product of the mine. The New York *Evening Post* says that at Butte, Mich., new works, with a capacity of 3,000 tons of ore a day, are being put up by the Anaconda mines, but they will hardly be ready before April or May, and then, if the company chooses, it can put out 200 tons of fine copper a day, at least doubling the output for 1887. It is believed that this abnormal price of copper cannot be maintained very long, and that when the crash comes it will be severe. The winter weather, however, will keep the output of the American mines down to a low point until spring, and probably the drop may be deferred until that time. The rise in copper has of course greatly affected the price of brass. Instead of forty per cent. discount, buyers now receive ten or less. Therefore manufacturers of cheap jewellery will be obliged to reckon a third increase in the price of their brass stock and copper for alloys.

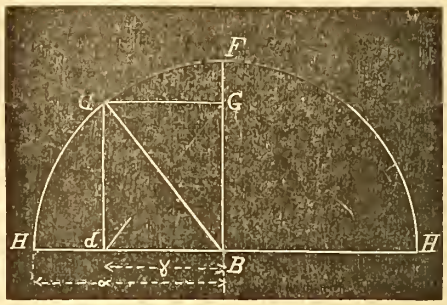
# The Theory of Adjustment.

By M. L. LOSSIER.

After the Memoir of M. JULES GROSSMANN.—From the *Journal Suisse D'Horlogerie*.

## CHAPTER I.—*(Continued from page 108.)*

SECTION 2.—In order to find the time occupied by the pendulum in making a portion of oscillation $d\,B$, the same comparison can still be made use of, and to calculate the time required for the mobile $D$ (fig. 3) to traverse the corresponding distance $D\,F$ upon the semi-circle $H\,F\,H'$. The time $t$ that the mobile will take to go from $D$ to $F$ will be:—




$$t = \frac{\text{space traversed}}{\text{speed}} = \frac{\text{arc } D\,F}{\alpha\sqrt{\frac{g}{l}}}$$

The arc $D\,F$ is the arc of which the sine* is $\frac{D\,G}{D\,B} = \frac{\gamma}{\alpha}$, it is then:—

$$\text{arc sin } \frac{\gamma}{\alpha}$$

But if we seek in the tables a length of arc corresponding to a given sine, it will be found indicated with the radius for unit. To have this length in millimètres, it is necessary then for us to multiply it by the length of the radius, or by $\alpha$, and we shall have:—

$$t = \frac{\alpha \text{ arc sin } \frac{\gamma}{\alpha}}{\alpha\sqrt{\frac{g}{l}}} \quad \text{or, by eliminating } \alpha,$$

$$t = \sqrt{\frac{l}{g}} \text{ arc sin } \frac{\gamma}{\alpha} \qquad (2)$$

*Numerical Example.*—Find how long in time the lift (30′) of a Graham anchor escapement adjusted to a seconds pendulum of 3° amplitude will last. The demi-oscillation will have then an amplitude of 1° 30′ or 90′, from whence

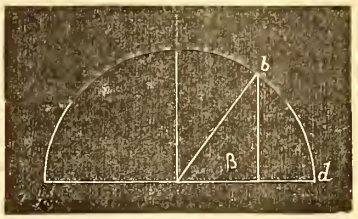
$$\frac{\gamma}{\alpha} = \frac{30}{90} = 0.3333:$$

the corresponding arc is:—

$$\text{arc sin } \frac{\gamma}{\alpha} = 0.3403$$

continuing $\sqrt{\frac{l}{g}} = \sqrt{\frac{994}{9808.8}} = 0.318$

from whence $t = 0.318 \times 0.3403 = 0.108$ sec.




* The *sine* of any angle $\beta$, is the length of the line $b\,c$ (let down perpendicularly from the extremity of the radius $a\,b$ upon the diameter $d\,e$) divided by the length of the radius, and the *cosine* is the line $a\,c$ divided by the same radius. Thus the sine of the angle $\beta$ is $\frac{b\,c}{a\,b}$, and the cosine of the same angle is $\frac{a\,c}{a\,b}$.

Section 3.—The foregoing formulæ (1)—*see page 108*—and (2), found for the pendulum, apply directly to the balance of a watch.

The balance is maintained in its neuter position, or in repose, by means of a spiral spring. When it is disturbed from that position it performs a series of oscillations analogous to those of the pendulum.

Here, the action of the weight is replaced by the elastic force of the spring, and the influence of the length of the pendulum by the influence of the radius and of the weights of the balance. We shall have then to replace, in the formula for the pendulum,

$$T = \pi \sqrt{\frac{l}{g}},$$

$l$ by a certain quantity $A$ depending on the dimension and the weights of the balance, and $g$ by another quantity $M$ depending on the elastic force of the spring.

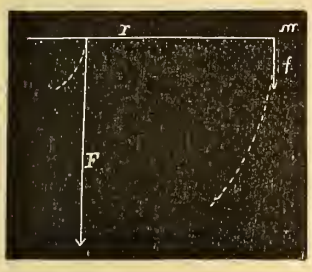
This formula will thus become :—

$$T = \pi \sqrt{\frac{A}{M}} \qquad (3)$$

which we cannot admit as exact *a priori*, but which we will reserve for demonstration later on. Let us say now that the quantity $A$ is called the *moment of inertia* of the balance, and the quantity $M$ the *moment of elasticity* of the spring.

Section 4. — *Moment of inertia.* — It is demonstrated, in mechanics, that a force, $f$, may be measured by the acceleration, $w$, that it imparts to a mass, $m$,* which is expressed by the formula $f = m\ w$. $(a)$

Take a mass $m$ constrained to turn around a point $O$ (fig. 4), from which it is distant $r$.




Here the acceleration is not rectilineal, but angular ; that is to say, that if this acceleration is expressed in linear measure, this measure must be in respect to a unit of radius, because it is evident that for the same angle travelled over, the length of arc will be different according to the distance of the mobile from the centre of rotation.

These two kinds of acceleration are connected by the formula :

$$\dagger\ w = \omega\ r \qquad (b)$$

in which $\omega$ expresses the angular acceleration.

On the other hand, the force $f$ must be replaced by its moment $F$ ‡ with respect to the point $O$, and we postulate :—

$$f\ r = F,$$

from whence

$$f = \frac{F}{r}$$

In other words, $f$ will be the force which, applied to the unit of distance from $O$, will be able to produce the same effect as $f$ applied to the distance $r$.

Replacing in the equation $(a)$ $w$ and $f$ by their values ascertained from $(b)$ and $(c)$, we shall have $\frac{F}{r} = m\ \omega\ r$, and the angular acceleration becomes :—

$$\omega = \frac{F}{r^2\ m} \qquad (d)$$

It is easily seen that the mass $m$, which we have considered as a point, may be distributed over an infinity of points, along a distance $r$ from the centre $O$, that is to say, upon a circumference having $r$ for radius.

This term $r$ is what is called the *radius of gyration*, and the expression $r^2\ m$, which, in the formula $(d)$, constitutes the resistance to the acceleration, is called the *moment of inertia* ; it is applied to a watch balance by assuming all the mass of the balance concentrated upon a circumference having a radius $r$. The circumference of gyration is then, for the balance, what the centre of oscillation is for the pendulum.

The moment of inertia, which we have expressed by $A$ in the formula (3), may be defined as—the weight $P$ divided by $g$ and multiplied by the square of the radius of gyration :—

$$A = \frac{P}{g} \times r^2 \qquad (4)$$

In practice, the radius of a balance to the interior of the bimetallic rim may be taken as the measure of the radius of gyration.

*Numerical Example.*— Find the moment of inertia of a balance weighing 0.6 gr., and measuring $16^{mm}.5$ to the interior of the rim :—

$$A = \frac{0.6 \times 8.25^2}{9808.8} = 0.00416$$

Section 5.—*Moment of Elasticity.*—A spring attached to its balance, without any action being exerted in any way, is in equilibrium, or at the dead point. If, at this moment the balance is rotated a half turn upon its axis, the molecular equilibrium of the spring will be broken, and it will require a certain force to maintain the balance in its new position.

The moment of this force will be the force itself $p$ multiplied by the distance $r$ from its point of application to the axis of the balance :—

$$m = p\ r.$$

*Numerical Example.*—

$$p = 0^{gr}.3963, \quad r = 10^{mm}.;$$

the moment of the force will be :—$m = 3.963$.

The angle the balance has been turned $= \frac{1}{2}$ circumference $= \pi$ (taking the radius as unit). If yet another turn is given to the balance, the angle will be $3\ \pi$, and we shall see that the weight necessary to maintain the balance in this position will be three times the initial weight ; that is to say, the force is proportional to the angle the balance has been turned.

We shall have then, by dividing the moment of this force by the angle, a constant quantity dependent on the elastic force of the spring, and which is the moment of elasticity which we have denoted by $M$ in the formula (3) :—

$$M = \frac{p\ r}{\alpha}.$$

In the above example we have :—

$$M = \frac{3.963}{3.1416} = 1.02725.$$

the moment of force of the spring will be then $M\ \alpha$.

We have found this by experience, and it remains now for us to demonstrate it by calculation, basing the latter upon the laws of elasticity.

The laws of elasticity developed by *tension*, that is, by an effort exerted in the direction of the length of a body, are the following :—

1.—*For an equal bar, the lengthening which is produced by an increase of the effort exerted, remains the same, whatever be the initial tension.*

2.—*The lengthening is proportional to the increase of the tension.*

3.—*It is proportional to the length of the bar.*

4.—*It is in the inverse ratio of its section.*

It is assumed that the limit of elasticity is not passed ; that is to say, that the body returns to its first length when it is left to itself.

Let us suspend now to an iron wire of $1^{mm.}$ square in section, upon which we have measured a given length (1 mètre for example), a weight of 1 kilog. This wire, under the effort of the weight, will be lengthened a certain quantity ($0.05^{mm.}$) which we will call $l$.

It is evident that the more elastic the metal the greater will be this quantity. In order to compare bodies with one another, the

* *Mécanique appliquée de Boequet*, I., p. 162.

† *Mécanique appliquée de Boequet*, I., p. 94.

‡ By the *moment* of a force is understood the product of that force by the length of its leverage.—*Mécanique de Boequet*, I., p. 32.

lengthening $l$ undergone under a given weight $P$ is ascertained, and from the figure obtained is calculated the weight $E$ that would be necessary to produce an equal lengthening to the primitive length $L$ of the wire :—

$$P : l = E : L$$

from whence

$$E = \frac{P\,L}{l}, \qquad (5)$$

If the section is irregular, $s$, the formula becomes, taking count of law (4) :—

$$E = \frac{P\,L}{l\,s}, \qquad (6)$$

and in order to have $P$, or the force of traction corresponding to a given lengthening,

$$P = \frac{E\,l\,s}{L}.$$

The quantity $E$ is called the *coefficient of Elasticity;* it would be for iron, from the above example :—

$$E = \frac{1000 \times 1000}{0.05} = 20{,}000{,}000.$$

For the steel of a spring :—

$$E = 26{,}000{,}000.$$

*Erratum.*—In the last equation but one in page 108. for $\frac{V}{v}$ read $\frac{v}{V}$

*(To be continued.)*

# The Lever Escapement

## CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. GROSCLAUDE, Professor at the Geneva School of Horology.

(TRANSLATED FROM THE FRENCH.)

*(Continued from page 107.)*

### FRICTION.

FRICTION constitutes, with the inertia of the matter, one of the points having the greatest influence upon the practical result of the performance of the lever escapement. Our readers will therefore perhaps pardon us if we renew the question from the first elements.

What is friction? The well-known definition is this :—Friction is the resistance that must be overcome in order to make one body slide upon another when a pressure exists between the two bodies. Numerous experiments made under varied conditions and with different materials, have led to the following principle laws :—

When two bodies rub one against the other in a dry state, that is to say when nothing but the air interposes between the surfaces in contact :—

1st.—Friction varies according to the degree of polish of the surfaces in contact, and according to the nature of the materials ;

2nd.—Friction is proportional to the pressure which exists between the two surfaces ;

3rd.—It is independent of the extent of the surface in contact ;

4th.—Under the ordinary conditions of practice, it is independent of the speed of bodies in motion.

Then, in order to estimate friction, it is necessary, from the second of the above principles, to know in each *particular* case, the pressure which exists between the two surfaces, pressure which is always normally exerted at these surfaces. If the body slides upon a horizontal plane it is the weight of the body itself which indicates the pressure. Since friction is proportional to this pressure, it is usual to designate it by a name called *coefficient of friction*, which indicates what part of the weight, or rather of the pressure, should be taken in order to obtain the friction. It is expressed in centièmes. This coefficient varies (first principle) according to the nature of the materials, wood, metal, &c., used, and the degree of polish of the rubbing surfaces. It can only be determined by experiments, the enumeration, more or less complete, of which is found in all treatises on mechanics. It must be stated, however, that there exists on this subject a great divergence of opinion among writers. It could hardly be otherwise, the nature of the polish and the quality of the material being so various.

Since, after the third principle, friction is independent of the extent of the surface in contact, we need not take the latter into account.

As regards the fourth principle, it is well to remark that although it is usual to say that friction is independent of speed, this is no reason for altogether ignoring the speed.

The *effort* required in order to obtain the gliding is the same, it is true, whatever be the quickness of the movement ; but what is very important, the mechanical *work* expended is not. Because this latter, being the resultant of an effort, and of the distance traversed by that effort, will be as much greater as the speed is greater. And let us not forget that it is work which is the true criterion for judging of the value of a mechanism. At the risk of repeating ourselves, we recall here that if a machine were perfect, whatever its mechanism, it would always render an equal amount of work to that which it consumes. In practice it is not thus, and this fact proceeds from the prejudicial losses produced by various causes, among which is friction, which diminishes the result. In order to explain clearly this difference between *effort* of friction and *work* of friction, let us take two examples.

Let us assume that an effort of fifteen grammes be required to move a weight of one hundred grammes upon a polished metallic surface.

This effort will be sufficient to maintain the movement, whatever be the speed, but, in this case, the work dispensed will be much more considerable as the distance traversed is greater.

The friction of a pivot turning in its hole is the same if the pivot is thick and if it is supported in a long hole ; but, for one turn of the arbor, the rubbing surface travels over a greater distance with a thick pivot than with a thin one, while the length of the pivot does not increase this distance, nor consequently the work of friction. It is for this reason that mechanics make spindles as small as possible but do not fear to make the bearings a certain length.

We will say later on why watchmakers depart from these rules, and avoid always having large surfaces in contact.

We have spoken up till now of friction as it exists between two surfaces without any lubricants ; the use of which last has the effect of diminishing friction. Here again, books of science give us coefficients of friction when the rubbing bodies are covered with different substances, such as water, lard, fats, oils, &c. Only in this case, these coefficients do not conserve the same signification. In effect, if any oil has the effect of diminishing the friction between two metallic surfaces, it introduces on the other hand a new resistance, that of cohesion of the molecules of the oil. This resistance, it is true, has not great importance in comparison with that of friction, above all if the oil is fluid and if the pressure has a certain importance : and it is for this reason that mechanics are accustomed to neglect it. But, in small mechanics, and especially in horology, where the pressures are relatively feeble, it would be imprudent not to consider closely this question.

Here the reader will ask if the principles which we have enumerated in speaking of simple friction are maintained when the surfaces in contact are lubricated. The response is negative ; it may observed in effect that, in these circumstances, the resistance to the sliding becomes proportional to the surfaces in contact, and moreover, it is so much the greater as the surfaces approach one another. In fact, two metallic plates perfectly joined and thoroughly lubricated, so as to prevent the air from penetrating between the surfaces, are found to adhere very strongly to one another and thus offer a resistance very much greater than ordinary friction.

We have here then the explanation of the fact that in watchmaking the frictions of points is always preferred to those of

large surfaces. In fact, if the pressure is feeble, friction properly called will be necessarily feeble also, and such a circumstance may certainly present itself, where, according to the extent of the surface of contact, the resistance from the oil will be greater. But if we only rub a fine point, we reduce the resistance of the oils to a minimum, and it is here the friction properly called which constitutes the greater part of the resistance to the gliding.

If it be admitted that the oil can produce a greater resistance than that of the friction which it is intended to diminish, it may be asked what advantage is there in lubricating certain surfaces. It is well to represent that, in one way or the other, there is always a resistance to overcome, a work to do ; and if the surfaces are not lubricated, this work results in a wear of the rubbing parts ; but if a fatty substance has been interposed, it is this that supports a good part of the wear ; and as this last case is preferable for the good preservation of the mechanism, it is this means that is generally resorted to, since it is easy to renew the oil. Meanwhile, when the body rubbed is of a very hard nature and the pressure is not very great, the lubricant may be dispensed with. This condition presents itself in certain parts of the spring detant escapement, where it is known that the absence of oil does not produce any bad effect.

*(To be continued.)*

## A Simple Watch.

By Bill Nye.

FOR thousands of years men have sought the best means by which to measure time. Clocks have ranged all the way from a plain stick stuck in the ground to the ornate town clock and gorgeous depot clock of to-day. It mattered little to the savage how slowly or how rapidly time passed, for he had no promissory notes to mature, no rent to fall due at a certain day, and no bills to pay. The dial, of course, was about the first open face timepiece of which we know, but it was not satisfactory to the employer, because the hired man spent so much time walking from the farther side of the farm to the dial to ascertain the hour, that it wasn't more than 500 years before an enterprising man, realising the needs of the time, invented the hour glass, a neat little instrument which only required two men to run it, one to up-end it during the day and one to perform a similar office at night, whenever the sand in one end had sifted into the other.

King Alfred next patented the candle scheme, consisting of twelve candles so graduated as to burn two hours each, which was a great boon. It required only a little over three hundred pounds of candles per year for such a timepiece, and to snuff them and light one as soon as the other had burned out, was a light and cheerful occupation for two men with a common school education at say 30 dols. per month and board.

The clepsydra was a water clock which consisted of a jar, the contents of which would run out of a graduated orifice in twelve hours. The man who attended to it, however, might or might not have graduated.

This jar was opaque, and so you might ascertain the hour by stabbing a notched stick into the water and observing carefully how far up it got wet. It was indeed a cheerful sight to witness the old gentleman stealing down the stairway on Sunday night while his daughter and a young friend, who could never be aught but a brother to her, sat in the parlour. The parent immerses a graduated shingle in a crock of rain water, looks at it thoughtfully, and then sets the dog on the now thoroughly terrified youth.

The clepsydra was introduced into Rome 158 B. C. by Scipio Nasica, who sold a great many of them and warranted them for one year.

They were a poor clock, however, in a cold climate, for they would most always stop in northern Asia or Dakota during the extremes of temperature peculiar to those climes. Still they were durable and versatile, for if you wearied of them in the clock line you could readily use them as butter crocks.

This instrument was finally arranged to operate a water-wheel, and from that the weight was introduced into the clock-economy. The machinery was added in the eight or ninth century. Then the escape was introduced, so that about nine hundred years ago tower clocks began to show their faces to the world.

We cannot help comparing the crude dial and the hour glass of two or three thousand or more years with the gorgeous and elaborate Waterbury watch of to-day.

I know that much sport is made of the Waterbury watch on account of its great simplicity, but that is an error. This watch is not simple. It is the man who thinks he can fix the Waterbury watch himself that is simple.

Two years ago I left my handsome gold watch at a place in Chicago, where the proprietor agreed to regulate it. I had it there over a year getting it regulated, until the charges had reached 45 dols., though I must state frankly that 43 dols. was money that the proprietor had advanced to me out of his own pocket.

That is the reason I hated to go and ask him for the watch even after I knew it must be thoroughly regulated.

I therefore purchased a Waterbury watch nine months ago and began the arduous task of winding it up. I had not owned it a week before I could wind it up partially at least without being frightened at the sound. A Waterbury watch can now be wound within ten feet of me without scaring me much.

But my great mistake was, that after a few months I got foolhardy and opened the watch to learn its ways. One dreamy, hazy afternoon in October, while the early apples were falling with a mellow plunk on the soft bosom of the earth, and the gaudy glory of a full-grown year was bursting forth on the brow of the mountain like the first rich red blossom on the bugle of a man who can drink or let it alone, I sat in my room in a reclining position meditating.

Some claim that I meditate too much, but I do not think so. Let others pitch in and work if they feel like it, but give me enough plain food and time to meditate and I am content.

But that has nothing to do with what I was speaking of. In a thoughtless moment I decided to open my Waterbury watch and see what made it tick so loudly. I did so.

When I opened the rich and highly-chased case, I began to see strange, fantastic forms flashed before my eyes. In a short time my lap was full of little wheels and small fragments of the future which this watch had concealed about its person.

I accumulated a bureau drawer full of fly-wheels, hair triggers, cams, eccentrics, doflickers, bull wheels clogged with forgotten moments, ratchets with a thin falsetto voice, small brass wheels with axle grease on their circumference, brassy smelling axle trees, little yellow screws, large steel screws with dark blue heads, and other things that I do not know the names of.

Then there was a low, asthmatic sound in among the intestines of this timepiece and a big, blue backward spring sprang forth, hit me between the eyes, danced back on its hind feet, jumping up and punched a hole in the ceiling, tried to spit on its hands, smote its heels together and darted up my trousers leg, meanwhile snarling at me in that gutteral, mean, quarrelsome way that a Waterbury watch knows so well how to assume.

I arose to go out into the hall when three bushels more of the spring boiled out of that yelping, muttering turnip, and gliding to the door shut it in my face.

The front end of the spring had now emerged through my shirt collar and began to bore holes in my head. I called for help but nothing save the low and desolate murmur and rumble of the watch answered me.

In a short time the room was full of this spring. I was on the bed doing the Laocoon act in my poor, weak way, and everywhere I could see evidence of the spring.

Finally the landlady came to see if I had them again. She opened the door just as the watch seemed to slip a new cog and betray some more of its true inwardness. It shot some more of that blue steel out into the hall, caught the lady by her back hair and hurled her down stairs.

When the police got there and got a line repairer to come and unwind me, that Waterbury watch had entire possession of the first and second floors of the house and was on its way down cellar.

And yet we meet men most every day who claim that the Waterbury watch is a model of simplicity.

# To Our Young Friends.

## WHAT OUGHT TO BE DONE.

*(From Eugène Fontenay in La Revue Professionnelle.)*

We know too much. Our knowledge renders us useless and paralyses our imagination. It would be better to throw overboard—first, all this cumbrous load, viz., the acquaintanceship of different styles—and then after that set ourselves to work. *August, 1880.*

I HAVE purposely taken the above as an epigraph, to comment on it and develop it as may seem suitable—for, although the author, I cannot disguise from myself that it seems to express a vain and unrealisable desire.

Before then discussing the matter, it will be well to know exactly the meaning to be attached to the two words which are to be frequently referred to in this discourse; these two words are *character* and *style*. I do not wish to enter into rivalry with the dictionary, but you have doubtless remarked, that in conversation, misconstructions often crop up, because in spite of the definitions of the dictionary—with which we should all assuredly be acquainted—one cannot always very well catch the value of an expression, this value being always subject to vary according to the surroundings in which each finds himself.

Each thing, each individual, has by nature, through some peculiarity, a form, a turn or trait particularly his own. It is that that we would call character. Characteristics are not visible to every one; one must, indeed, confess that men are for the most part unconscious of them. Some again endowed with more attention, with more skill, delicacy or sensibility remark them, understand them, and give their attention to reproducing them. Those men are the artists.

But each artist has his particular apprehension, his manner of seeing, of feeling, and of remarking what he has felt—in a word his originality; from whence it results that if a copy of the same object be made by ten different artists, each of them will have interpreted the model in his own way; and the ten copies, which, I will presuppose have all been done by people of ability, although they resemble the model, will differ from each other in some point. This difference certainly proceeds from the personality which each artist has introduced into his copy. This inevitable and involuntary introduction is more or less intelligent, more or less remarkable. When it is very remarkable, it adds a characteristic to the model, or rather it is so identified with the model—all the traits and shades have been so turned to account, that the copy reveals to all, beauties which had hitherto remained undiscovered.

This art of seizing the characteristic trait of each thing ought to be the constant endeavour of the designer; the mind plays a greater part than merely the hand; those who possess the faculty are not numerous, but they know how to put character into their drawings, and this character borders sometimes even on the threshold of genius.* We may conclude therefore by saying that a drawing holds its character, more from the talent of the artist than from the character even of the model.

Style is the mode of expression employed at each epoch. Styles are determined by various causes—the form of a government—the beliefs of a people—public or private events—the fashions make a part of these causes, but the principal and first of all are as to mode of life. The products of the ground on which we live, by their constant action, exercise a considerable influence on our conceptions. All our imagination springs from it, but also, so to speak, modified by a certain conventional fashion, after having been subjected to the influence of current ideas belonging to each epoch or population.

Thus, for example, the lotus is actually the base of Indo-Chinese ornamentation, as it has been from a remote period that of the Egyptian, and yet those two styles have nothing in common. The palm is employed otherwise by the Persians than by the Indians. Foliage and flowers are presented differently in the works of the Greeks and in the illustrations of manuscripts of the middle ages—in the compositions of the Restoration and in the decorations of the seventeenth and eighteenth centuries. The epoch of Louis XV. in bringing fancy leathers into its system of ornamentation, changed the former by the style. Bows of ribbon have been differently interpreted in each different style employed, and even to the more precise forms which the animal reign furnished: all have come under different interpretations. Do we not see in heraldic art, lions, leopards and eagles extraordinary? they are not even like each other but vary according to the place and to the time.

The current, therefore, of ideas of certain favourable periods furnishes characteristics whence styles are composed, and those characteristics are so marked that they have permitted of a method of classing and instruction after which we have been led to study them.

* * *

It results from the foregoing, since the style is composed from certain recognised characteristics, more than to the subjects which have been successively employed, that in many cases the characteristics have existed before the style. If you would permit me to make a comparison, I would say that the style to me represents a phrase of which the characteristics form the words. That may appear paradoxical but rest assured it is not so—hence, no words, no phrase: so no characteristic, no style.

When you quit school you are acquainted with the styles, and have reason to think yourself well armed. In effect you will draw at first attempt a pretty design of Henry II. for a brooch, or else a sentimental composition in the style of the eighteenth century with turtle-doves, torches, quivers, &c., &c.

When you have gone on with that for some time and with success, I am sure your talent will be appreciated; you will have earned the reputation of knowing your styles well. By-and-by they will come and say to you, "*Why! it is always the same thing, make us then something new.*"

Do we not in fact hear repeated in conversations, in journals, in books, everywhere, "Our age is absolutely wanting in originality; it has found out nothing new; it can do nothing but copy the ancients;" and why? it works in the same groove.

It is thus that taking up again my present comparison I would say to you, "Leave off all phrases composed by the ancients, that is to say style, and go back to the study of words. Do as your forerunners have done: put yourselves freely in communication with nature, it is she who was their master.

Take then a pencil and paper, which you should never omit to have with you. Go every spare day from morning to night to the meadows, to the woods, to the wastes by the roadside. At first—Ah! at first, you will find nothing; it is well to warn you beforehand against the disagreeable surprise. It is in fact very rarely that a beginner finds an object that seems to him worthy of his attention and talent, and beyond all of his pencil and paper. But persist, and if your fancy does not happen to be seized upon by some object, well copy; copy all the same; do not leave off copying: little by little, conviction will come to you with experience, with the knowledge of beauties, which you will be then astonished not to have discovered at the first glance. Copy the leaves of the trees, the grass of the fields, the thousand little flowers that lie hidden there, patiently one by one, without gathering them—they would fade. Especially examine them thoroughly before commencing your drawing, and try to know what you are going to do, and to grasp well their characteristic.

You will have, in spring-time, all the buds—those growing on the trees, as also those of the cultivated flowers and of wild herbaceous plants, with their mysterious foldings spreading to the light of day. They will lay before you a store of endless surprises. In summer you will contemplate the splendid developments of the vegetable world; it is the period when the formation of outline is confirmed and is the realisation of all the lovely promises of spring. In autumn you will have the verdure with its changing colour—fading, curling and contracting—the fruits, the husks and the seed; then the uncultivated grasses spread all around, astonishing you by their infinite variety. Let everything be the object of your research; nature has made

* It is told of a great Japanese designer that he had an admirable faculty for seizing the particular character of everything. Ok-Sai, when already at a great age, said that if he could hope to live to 150 years of age, though working steadily, he would always, he thought, manage to draw a fresh subject.

nothing that is unworthy of interest; seek to reproduce in their movements, insects, and those animals you may happen to encounter in your wanderings. Unfrequented places and water-edges will furnish you with subjects innumerable.

But in your pursuit do not allow yourself to be seduced by grand scenery, for whatever charm that might offer you it would turn you aside from your work. Do not let it escape you that you are a jeweller and not a landscapist. Study forms and not their effects; store them in your brain, if it is possible by thousands. Especially guard against the desire to draw immediately from your labours or to seek a direct application—you would make a false start. What is necessary, is to gather as the bee, which never thinks of making her honey till her harvest of pollen is abundant. One day you will be astonished to see with what facility, new arrangements and elegant forms will spring up from under your pencil. and if nature has gifted you, all that you draw will have character.

Suppose that others do the same as you, from this assemblage of work, from the comparison which each of you will make, a style or particular method cannot fail to spring up. I have already shown you that the same subjects interpreted by different people have furnished different styles; in the same way, the mode in which you and your comrades will interpret them, if you have been able to succeed in rendering your mind independent of school memories, will undoubtedly set up characteristics which will be personal to the generation to which you belong, and which one day taken together will form a style. And lastly, remember that to do a thing well one must have one's heart in one's work.

W. A. Smith, *Aberdeen.*

## Silver-Ware Manufacture in the United States.

THE origin of the manufacture of silver ware in the United States is quite within the memory of old silversmiths who are still in the business: according to an American contemporary it dates from the year 1842. Prior to that year there were no regular factories of plate in the country. The few silversmiths who had opened shops in the commercial and other cities for the repair of watches and imported plate, made cups, snuff-boxes, watch chains and other small articles, in a desultory way; but there was no regular manufacture. The few expert workmen of those days had little capital of their own. They had only their tools and their skill; and the usual thing for them to do was to go to the jeweller and silver merchant and obtain from them orders to make special pieces of plate. The merchant supplied the ingot, or sheet of silver, and the workman hammered it out and wrought it into the object desired, bringing back to the merchant the finished work and the surplus scraps of metal, both of which were carefully weighed to see that the workman had not abstracted a part of the raw material. In 1842 a number of the silversmiths of New York City and other places got together to consult about the interests of their trade. Mr. Clay was agitating at that time for a protective tariff, and the silversmiths regarded the hour as auspicious for an effort to obtain some recognition of their art from the Government of the country. A delegation was accordingly sent to Washington to see Mr. Clay. Mr. Clay asked the men what the prosperity of their business required, and promised to do what he could for them. It was a very easy matter to obtain recognition in the bill which was being drawn up, silver ware being so exclusively an article of luxury; and accordingly, when the Act passed in August of that year, a duty of 30 per cent. was levied by it upon all importations of gold and silver ware, whether solid or plated. This protection is said by old silversmiths to have given the industry in this country its first decided impetus. Nearly all the shops enlarged their business immediately after the law was passed.

About this time the art of electro-plating came into use; and this gave a still more remarkable impulse to the industry in the United States by cheapening the cost of silver table ware, and vastly extending its sale. Early in the century it had been discovered that copper or gold held in solution might be made to settle upon the faces of objects suspended in the solution, and to form upon them a thick film, by passing a current of electricity through the bath to the object to be gilded or coppered. It was found that the film of metal, once formed, might be taken off and used as a mould to produce an exact copy of the original upon which it had been deposited. It was then found that metallic objects might be gilded by this process, and made to appear like solid gold. The invention was at first regarded as a curiosity. It was not until about 1840 that its value for the gilding and silvering of articles of common use was realised. Numerous experiments were then made with the invention both in the United States and Europe. Professor Silliman suggested that prussiate of potash would hold silver in solution without oxidising the baser metals. This was a step in advance. Subsequently it was found that the solution of cyanide of potassium would do the work better, and silver plating then became practical and popular. The idea was taken up by New England manufacturers, and several very important factories of plated ware and cutlery were started to manufacture for the American market. It was found that the most elaborate dinner and tea sets could be produced by the new process, coated with the purest silver to any thickness, for about one-fourth the expense of solid ware; and Yankee push and enterprise soon found a way to create a demand for it in every part of the country. The public taste had begun to crave elegant table sets, and the low cost of the new class of goods secured for them a ready recognition and great favour. Iron forks and knives were virtually banished from the tables of all people of taste, and from hotels and steamboats; plated ware and dinner and tea sets made their appearance everywhere.

The earliest silversmiths of the United States made their dinner and tea sets, punch bowls, goblets, &c., by hammering the various dishes from flat sheets of solid metal, shaping them upon iron forms called "stakes." The process of building up all round and oval dishes is still the same in principle, only that the hammer is no longer used, and the iron stake is thrown aside for a block of wood. Suppose the dish to be a sugar bowl: A perfectly round disc is cut from a flat sheet of solid silver, weighed, and turned over to a workman, to whom it is charged on the books. The workman has a block, made in pieces like a hat block, so that if a certain key be removed it will fall apart. The block is put together and keyed, and put into a lathe touching the flat disc of silver. The block and silver disc are then made to revolve at great speed. A smooth steel tool is pressed against the disc, and the malleable metal is made to bend down upon the block little by little, and gradually enclose it, forming the body of a perfectly symmetrical and smooth sugar bowl, without joint or flaw. The top and bottom are properly trimmed with a sharp tool, and the bowl taken from the lathe. It would be impossible now to get the wooden block out of the silver bowl were it not that the block is made in pieces. The workman loosens the key which binds the block together, and shakes the pieces out of the narrow mouth of the sugar bowl. The bottom of the sugar bowl is shaped upon an appropriate block by the same process, which is called "spinning up." The handles are cast, and the different parts fastened together by soldering under a blow-pipe. This is in principle the manner in which all round and oval dishes, presentation-pieces, goblets, &c., are made from solid silver. For convenience the bodies are sometimes made in several parts, so as to permit the insertion at different places of a flat strip of decorated metal which has been rolled in a machine, and they are then subsequently assembled by the silversmiths proper, and united by soldering. The soldering is so perfectly done that the finished article is in fact one piece of solid work,—as much so as though it had been cast. All scraps are carefully collected and weighed, and credited to the workman to whom they were previously charged. Large objects like punch bowls, and all others of irregular shape, are hammered out by hand from flat sheets of metal and put together by soldering. Projecting ornaments, like monograms, flowers, handles, &c., are frequently cast solid and put upon the piece in the usual way; but by far the greater part of the decoration is done by chasing and engraving. The pattern is drawn in black and white upon sheets of paper. The workman goes all over the inside of the

goblet, teapot, or other piece, whatever it may be, with a delicate hammer, and beats down the metal, so as to raise the large leaves, flowers, scrolls, &c., of the pattern into relief on the outside of the piece. The dish is then filled with melted pitch and resin, which is allowed to solidify and form a baeking, in order that it may not lose its symmetrical shape in the subsequent processes. The workman next goes earefully over the whole of the surfaee outside whieh is to be decorated, and fashions it by indenting and beating down the metal with little chisels and a hammer, so as to leave a clear, sharp-cut pattern raised in high relief upon the beaten-down background. The pitch is then removed by melting, and the dish goes on to be smoothed, burnished, frosted, satin-finished, or gilded, as the case may be, for the store. The ornamentation of flat surfaces is sometimes done by etching. Spoons and forks are made by rolling in a machine, the pattern of the fork or spoon being engraved on the surface of the rollers. The edges of surplus metal are removed by elipping and filing, and the article receives its final shape under a die. The handles of nut-pieks and knives, when hollow, are stamped in a die, in halves, and united by soldering. In the solid-silver shops great care is exercised to prevent waste of metal. The waste in polishing, clipping, filing, &c., is enormous, amounting to, in large shops, from four to six hundred ounces a week in the progress of polishing with leather and cotton alone. All the refuse of the shops, the grease, the dirt of the floor, the water in which the silver is washed, &c., is carefully saved, and sent to the furnace for the extraction of the metal. With all the precautions that intelligence can suggest, it is still found that five per cent. of the metal weighed out to the workmen is never reeovered.

In the factories of plated ware a large part of the work is done by stamps, dies, and presses, and more of the ware is cast than in the solid-silver shops. The metal forming the basis of the pieces is usually German silver (an alloy of nickel, copper and zinc), britannia, white metal, and brass and copper are sometimes used for very cheap work. The original method of plating the ware with silver was to dissolve the metal in nitric acid and preeipitate it as a cyanide by cyanide of potassium. The precipitate, being washed, was dissolved in a solution of cyanide of potassium. The object to be silvered was then connected with the negative pole of a powerful battery, dipped in nitric acid, and then suspended in the solution of silver. After a few moments it was taken out and well brushed, and then replaced in the solution. The silver begins to make its appearance on the surface of the objeet, and in a few hours has covered every part of it with a uniform deadwhite coating of pure metal. The process may be stopped when the plating has reached the thickness of tissue paper, or may be continued until the piece is double or triple plated. The stronger the current of electricity, the harder will be the plating. When taken from the solution the piece is washed and then burnished and finished in the ordinary manner. Latterly, plating is carried on by a variation of this proeess. The silver is not dissolved and held in suspension, but is put into the bath of cyanide of potassium in the form of a plate attached to the positive pole of the battery. The eleetrical current decomposes the silver, and the dish attached to the negative pole then becomes eovered with the dissolved metal as before.

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British Horological Institute.—The half-yearly general meeting of the members of this institute was held at the Institute, Northampton Square, E.C., on Tuesday, 17th ulto., Mr. J. Tripplin, V.P. presiding. The report for the half-year ended December 31, 1887, submitted a financial statement for the first half of the year ended June 30. It showed an increased income as compared with the corresponding half of the previous year, and a balanee in the hands of the Treasurer of over £75. An alteration, increasing the number of vice-presidents to six was carried by a large majority, and it was arranged to present to Mr. Jones an illuminated address recording his eminent services. A silver medal was offered for competition by the Worshipful Company of Turners for 1888, among students of the practieal classes for the best speeimen of hand-turning left from the graver. By the kindness of Mr. Samuel Jackson and Messrs. Henry Picard and Frere, who each gave five guineas for the purpose, the Council of the Horological Institute had been enabled to offer a prize of five guineas for the seeond best practical essay on "Modern methods of turning, drilling, boring, pivotting, and polishing applicable to watch work, by means of modern applianees, and either the hand or foot wheel." There were at present 369 members and nineteen associates on the books. The report, whieh was moved by the ehairman, was seconded by Mr. D. Buckney, and adopted, and after the usual thanks, the meeting adjourned.

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## Workshop Memoranda.

Easy Flowing Silver Solder.—The following ingredients make an easy flowing silver solder: 2 dwts. eoin silver; 1 dwt. brass; 3 grains zine.

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The Welding of Metals by Electricity.—Professor Elihu Thomson, of Lynn, Massachusetts, has invented a proeess of welding metals by electricity. The welding of iron and steel by means of exeessive heat is nothing new, but one of the great advantages of the new process is, that it is applicable not only to the metals named, but also to cast iron, alluminum, brass, copper, zinc, German silver, &c. The last named metals have always been considered as metals to which the welding power eould not be applied successfully for practical use, but by the new proeess any two of the metals named ean be welded successfully. The reason of this lies in the following partieular nature of applying electricity to the heating of metals:—Cold metal is a better conductor for electricity than hot metal, and by this feature metals are heated evenly during electric welding, and brought up to the necessary degree of heat simultaneously.

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Particulars of a new departure in brazing and welding have been communieated to the *Society of Arts Journal* by Mr. Thos. Fletcher, of Warrington. The cheapening of oxygen by Brin's process of manufacture has put into the hands of metal workers a new power. Having reeently made a few experiments with the eompressed oxygen and coal gas, he found that with a half-inch gas supply a joint eould be brazed in a two-inch wrought iron pipe in about one minute, the heat being very short, the redness not extending over one inch on each side of the joint. The appearance of the surface after brazing led him to experiment further with welding, a process whieh is not possible with ordinary eoal gas and air, owing to the formation of magnetic oxide on the surfaces. Contrary to his expectation, a good weld was obtained on an iron wire one-eighth of an inch diameter with a very small blow-pipe, having an air jet about $\frac{1}{32}$-inch diameter. This matter requires to be taken up and tried on a large seale, for such work as welding boiler plates, which, it appears to me, can be done perfectly with far less trouble than would be required to braze an ordinary joint. The great advantage of this would be that the boilers would require no handling, but could be welded with an ordinary large blow-pipe in position, and with about one-tenth the labour at present necessary. The cost of the oxygen is trifling, and it is evident, from the results obtained in brazing, that the eonsumption of gas would be eonsiderably less than one-fourth that necessary with an air blast, irrespective of the fact that welding is possible with an oxygen blast, whereas it is not possible if air is used. The surface of iron, heated to welding heat, by this means eomes out singularly elean, and free from scale, and a small bottle of compressed oxygen, with a blow-pipe, and a moderate gas supply, would make the repairs of maehinery, boilers, brewing eoppers, and other unwieldy apparatus, a very simple matter. The trouble and difficulty of making good boiler-crowns, which so frequently "come down," would be very small indeed, when the workman has an unlimited source of heat at command, under perfeet and instant control.

# Gazette.

### PARTNERSHIPS DISSOLVED.

Seear, Hasluck & Co., Holborn Viaduct, E.C., chartered accountants. Skinner & Co., Birmingham, goldsmiths. W. Tilley and J. E. Wilkins, Forest Gate, pawnbrokers. J. Rosenthal & Son, Manchester, wholesale jewellers. Anthony Schwarz and Augustin Schwarz (trading as A. Schwarz), Holywell and Flint, watchmakers. T. Wilkinson & Sons, Birmiugham, electro-plate makers. Thwaites & Reid, Bowling-Green Lane, Clerkenwell, clock manufacturers. Collis & Co. and S. W. Smith & Co., Birmingham, electro-plate manufacturers. Ward & Frith, Sheffield, steel manufacturers. Bash & Rodrigues, Hatton Garden, diamond polishers. Raban & Son, Luton, watchmakers. Ebenezer Stacey & Sons, Sheffield, Britannia-metal manufacturers. W. Osborn and J. H. Bailey, Birmingham, manufacturing jewellers.

### THE BANKRUPTCY ACT, 1883.

#### RECEIVING ORDERS.

*To surrender in London.*—William Fitch, Mare Street, Hackney, watchmaker.

*To surrender in the Country.*—David Elias and John Elias (trading as David Elias & Son), Bangor, watchmakers. Louis Desgardin, Bristol, jeweller. Clara Foord and Ellen Pickersgill (trading as J. B. Foord & Son), Hastings, jewellers.

#### PUBLIC EXAMINATIONS.

*In the Country.*—H. N. Ray, Brighton, watchmaker; February 9, at 11. F. J. Tyers, late Aston, Birmingham, jeweller; February 2, at 2. L. Desgardin, Bristol, jeweller; February 10, at 12. Clara Foord and Ellen Pickersgill, Hastings, jewellers; February 13, at 1.

#### ADJUDICATIONS.

*In the Country.*—H. N. Ray, Brighton, watchmaker. D. Elias and J. Elias, Bangor, watchmakers. F. J. Tyers, Aston, Birmingham, jeweller. R. Stuart, Bolton, clock-spring maker. L. Desgardin, Bristol, jeweller.

#### NOTICES OF DIVIDENDS.

*In London.*—W. Van Walwyk, Clerkenwell Road, diamond mounter; 3s. 10d., first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street.

*In the Country.*—G. W. Barrow, late Chelteuham, jeweller; 2s. 6d., first and final; January 24, J. Villar, Chelteuham. J. Sutton (trading as J. P. Cutts, Sutton & Sons), Sheffield, optician; 3s. 6d., first and final; W. H. Tasker, Sheffield. J. Sharpe (trading as J. Sharpe & Co.), Birmingham, wholesale jeweller; 3s. 3½d., first and final; 77, Colmore Row, Birmingham. T. C. Judge, Chard, clockmaker; 3s. 4d., first aud final; January 23, 17, Colmore Row, Birmingham. G. H. Simmons, Builth, jeweller; 6½d., first and final; January 27, Official Receiver, Llanidloes.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

17,493. E. Kohn, a communication from Joseph Pallweber, Germany, for "Improvement in clocks." Dated December 20, 1887.

17,494. J. H. Pollok, Glasgow, for "Improvements in the wet method of extracting gold from crushed ores or other finely divided auriferous material." Dated December 20, 1887.

17,495. J. H. Pollok, Glasgow, for "Improvements in the wet method of extracting gold from crushed ores or other finely divided auriferous material. Dated December 20, 1887.

17,582. E. F. H. H. Lauckert, London, for "Apparatus for indicating the time during which electricity is used for lighting or other purposes." Dated December 21, 1887.

17,728. J. Wood, Birmingham, for "An improved bracelet-fastening." Dated December 24, 1887.

17,773. C. H. Bingham, London, for "Improvements in motive-power for clocks and similar apparatus." Dated December 27, 1887.

4. T. Bäuerle, London, for "Improvement in lamp locks." (Complete specification.) Dated January 2, 1888.

289. W. Owston and F. Wilton, Forest Hill, for "'Multum in parvo' key case or combination key case pocket book, purse or knife." Dated January 7, 1888.

421. H. R. Lewis and O. B. Phillips, London, for "Improvements relating to the extraction of metals from refractory, complex and other ores." Dated January 10, 1888.

572. H. Forman, London, for "Improvements in shirt and collar studs, cuff studs, or solitaires and other dress fastenings and ornaments." Dated January 13, 1888.

587. W. Becker, London for "Improvements in or pertaining to the casting of metal ingots." Dated January 13, 1888.

661. A. Lugrin, London, for "Improvements in repeating watches." Dated January 16, 1888.

662. A. Lugrin, London, for "Improvements in the striking mechanism of repeating watches." Dated January 16, 1888.

765. E. L. Gyde, Birmingham, for "An improved night clock." Dated January 18, 1888.

780. W. J. Mayell and A. R. Molison, Swansea, for "Improvements in pins for brooches and such like ornaments." Dated Jauuary 18, 1888.

804. M. Pulvermann, a communication from Carl Bohmeyer, Germany, for "Improvements in electric clocks." Dated January 18, 1888.

835. C. R. Richardson, London, for "The making of a combination bracelet and purse in all metals." Dated January 19, 1888.

## Recent American Patents.

| | |
|---|---|
| Burnishing Machine. E. B. Allen | 374,885 |
| Button, Collar. W. Scott | 374,429 |
| Button or Stud. W. W. Covell | 374,115 |
| Button or Stud. B. Lyon | 374,336 |
| Button or Stud. G. W. Prentice | 374,626 |
| Casket Handle. W. H. Blackford | 374,110 |
| Castings, Device for Truing Metal. H. Rung | 373,855 |
| Chuck. B. F. Chappell | 374,732 |
| Chuck. L. D. Jones | 374,743 |
| Chuck, Drill. A. D. Goodell | 374,593—374,594 |
| Chuck, Lathe. F. L. Gregory | 374,405 |
| Clock Case. A. Bannatyne | 374,516 |
| Clock Winding Mechanism. A. E. Hall | 374,061 |
| Coffee Pot. W. A. Krag | 374,603 |
| Cuff Holder. J. M. Bolton | 374,579 |
| Dial, Timepiece. E. A. Lewis | 374,605 |
| Electro Mechanical Movement. H. Van Hoevenbergh | 374,883 |
| Eyeglass Holder or Hook. W. J. Rand | 374,702 |
| Eyeglasses, Manufacture of Blanks for. H. Lenfant | 374,546 |
| Files, Machine for Cutting Edges of Flat. C. M. Fairbanks | 374,051 |
| Hammer Tool, Revolving Electric. W. G. A. Bonwill | 374,580 |
| Horometer, Electrical. B. M. Hammond | 373,975 |
| Jug Cover. E. A. Brownfield | 374,238 |
| Lathe Tool Holder. J. L. Bogert | 373,878 |
| Moulding Emery or other Plastic Wheels, Machine for. C. Heaton | 374,065 |
| Music Box. L. Campiche | 374,394 |
| Music Box Motor. C. H. Jacot | 374,410 |
| Musical Box. O. P. Lochman | 374,127 |
| Musical Instrument, Automatic. J. McTammany | 374,616 |
| Riveting Machine. C. Hall | 373,891 |
| Rolling Machine, Metal. Bagaley & Hainsworth | 374,335 |
| Sheet Metal, Ornamentation of. F. Rudolph | 374,559 |
| Tag, Jewellers'. E. S. Burbank | 374,823 |
| Tap Hole Closer. T. A. Taylor | 374,855 |
| Temperature Controller. R. Newton | 374,847 |
| Temperature Indicator, Electric. J. C. Boyle | 374,581 |
| Tools to their Handles, Device for Securing Edged. T. H. Neal | 374,369 |
| Tooth Crowns, Instrument for Forming. H. W. Watkins | 374,382 |
| Watch Case Spring. A. Humbert | 374,535 |
| Watch, Stem-winding. S. C. Smith | 374,760 |
| Watches and Clocks, Mainspriug Brace and Fastener for. C. T. Higginbotham | 374,359 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

# Correspondence.

*All Letters for Publication to be addressed to the* EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

### TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

### [IMPORTANT REGULATIONS WITH REGARD TO THE HALL-MARKING OF SWISS WATCHES INTENDED FOR THE ENGLISH MARKET.]

Sir,—The Swiss Government have lately passed a Law with reference to Watch Cases which seems to me of considerable importance to the British Manufacturer.

I have therefore had a translation made, and I send you a copy in case you should think well to insert a notice thereof in your journal.

WALTER S. PRIDEAUX.

Goldsmiths' Hall, London, E.C., *January* 23, 1888.

*DECEMBER 24, 1887.*

### THE SWISS FEDERAL COUNCIL

In virtue of Art. 1 of the Federal Law concerning the control and guarantee of the standard of gold and silver wares of December 23, 1880, and of Art. 8 of the Executive Ordinance of May 17, 1881,

And making, moreover, use of the powers conferred upon them by the complementary disposition added by the Federal Law of December 21, 1886, to Art. 2 of the Federal Law of December 23, 1880.

On the proposition of the Federal Board of Trade and Agriculture

*Decrees:—*

1.—For gold watch cases bearing the 18-carat or 0·755 standard mark or both these marks together, and for silver watch cases bearing the standard mark 0·935 or sterling silver 0·935, marking is obligatory.

The signs indicating the standard must be encircled.

2.—Gold and silver watch cases intended for England and bearing either of the above standard marks, cannot receive the official stamp unless the assaying practised on each proves that they really are in their entirety, as well as in all their component parts, including the inner caps, of the described standard, under reservation of the dispositions of Art. 4 of the Regulations of May 17, 1881 with regard to ornaments placed on the exterior.

The stamping of bow-rings is obligatory.

3.—The manufacturer who presents for stamping, watch cases intended for export to England, must make express mention of the same upon the declaration required by Art. 2 of the Regulations of May 17, 1881.

4.—The marking (stamping) of the articles mentioned sub. Art. 2 of the present decree must be done in the following manner:—

For the standard 18-carat gold or 0·755: by two imprints of the stamp, "Large Helvetia," and one imprint of the stamp, "Small Helvetia."

For the standard of 0·935 silver: by two imprints of the stamp, "Large Bear," and one imprint of the stamp, "Small Bear."

These imprints must be stamped on the inside of the cases. Instructions from the Federal Board of Trade will determine in a precise manner the way in which the indication of the standard and the assay marks shall be placed, so as to form a regular and uniform design.

Gold bow-rings destined for cases of the 0·755 standard, and silver bow-rings destined for cases of the 0·935 standard shall bear, the former two imprints of the stamp, "Small Helvetia," the latter, two imprints of the stamp, "Small Bear."

As to the stamping of all other parts of the case the existing dispositions remain in force.

5.—If gold or silver cases which have been presented to be assayed, are not of the standard indicated thereon, due consideration being given to the margin allowed by Art. 2 of the law of December 23, 1880, the assay offices shall proceed according to the legal dispositions.

6.—The present decree comes into force immediately.

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*DECEMBER 27, 1887.*

## INSTRUCTIONS TO THE ASSAY OFFICES.

Art. 4 of the decree of the Federal Council, dated December 24, 1887, with regard to the control and marking of gold and silver watch cases intended for export to England, prescribes that the Federal Board of Trade shall issue instructions as to the manner in which the indications of the standard and the official marks (stamps) shall be placed, so as to form a regular and uniform design.

We have the honour to give you in the present circular, the instructions referred to.

### 1. INDICATION OF STANDARD.

The standard shall be indicated in conformity with the following designs:—



### 2. MARKING (STAMPING).

For gold: two imprints of the "Large Helvetia," and one imprint of the "Small Helvetia."

For silver: two imprints of the "Large Bear," and one imprint of the "Small Bear" shall be the characteristics of the marking as prescribed by the above decree.

The respective marks are to be arranged so as to form a triangle, at the top angle of which the small mark shall be placed, the two large marks being placed at the base; the marks shall be 3 millimetres apart from each other.

We give below designs of this mode of marking.

The lids (covers) of cut hunters (boîtes guichet) shall bear on the top, under the pendant, the signs showing the standard, and below, above the joint, the three official marks.

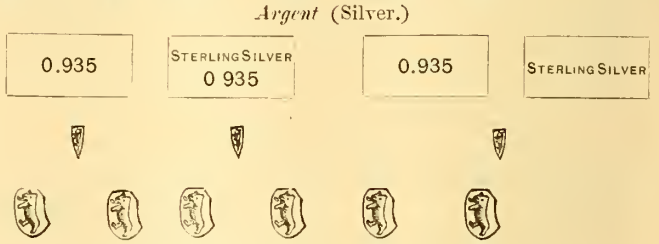
It is optional, according to the decree of the Federal Council of December 24, 1887, to present for assay bow-rings with the cases or separately, but the marking of bow-rings being obligatory for this kind of cases, those of which the bow-rings should not be marked would be considered irregular.

The two imprints which bow-rings must bear shall be placed on each side of the maker's mark.

### 3. COMPOSITION OF THE MODE OF MARKING.

*Or* (Gold.)


*Argent* (Silver.)

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DEAR SIR,—In the Report on the watches rated here last year, printed on page 104 of your present volume, there is a misprint in the table, which I shall be obliged if you will kindly call attention to.

The watches Nos. 13 and 14 on the list should have the maker's name Jos. White not Jas. White, the depositor being the same as the manufacturer named higher up as the successful competitor for the premier position.

Yours faithfully,

G. M. WHIPPLE, *Superintendent.*

Kew Observatory, Richmond, Surrey, *January* 25, 1888.

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# Buyers' Guide.

The

# Watchmaker, Jeweller & Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

VOL. XIII.—No. 9.] MARCH 1, 1888. [Subscription, 5s. per Annum. { Post Free.

CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

**Correspondence.**—Correspondence is invited on all matters of interest to the trade. Correspondents will please give their full address in each communication, not necessarily for publication, but as a guarantee of good faith.

**Address** all business communications to

THE WATCHMAKER, JEWELLER & SILVERSMITH,
**7, ST. PAUL'S CHURCHYARD,**
**LONDON, E.C.**

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

THE vagaries of public clocks is a theme upon which writers might have descanted and horologists waxed poetical.

The feelings engendered, however, by these misleading libellers of old *Chronos* have usually found expression hitherto in that form of deprecable profanity (which has no direct application) evoked from persons of highly nervous temperament by any unwonted excitation consequent on disappointment generally; and we are not aware that it is on record that any much more practical method of evincing disapproval of the irregularities referred to has ever been taken, except in a few isolated cases. As regards those people who live in the vicinity of public clocks, their want of concurrence in their behaviour is manifested in a precisely similar (but possibly more passive) manner, with the addition of a strong disinclination to contribute their quota for the repair and maintenance of the same.

That such a subject should be neglected by writers is the more surprising in that it contains elements of originality which might be utilised collaterally and eloquently developed; but the negative result is mainly to be deplored on account of the excellent opportunity which has been missed of adding to the fasciculus of horological literature a unique contribution, which might have been treated without any regard to chronological order.

As compared with the larger Continental towns, London is vastly worse off in regard to a uniform system of public time; while our own provincial towns are likewise far ahead of the metropolis.

As we are referring here only to the larger public clocks, we shall say nothing about the various existing synchronising systems, although doubtless some of them could be adapted, if desirable, to the control of turret clocks. What we would draw attention to is the unsatisfactory state of things which leaves the provision and distribution of public time in incompetent and irresponsible hands. Take, for example, our parish church clocks; most if not all of them have been purchased out

of the rates—yet, what control have the ratepayers, as a rule, over these clocks? It was only the other day that a body of the Southwark vestrymen tried to shirk the responsibility of paying for the winding of the parish church clock (which payment, by the way, is the only connexion the vestry has with the clock), which was originally paid for by the ratepayers. This is obviously wrong, and is alike opposed to technical and public interests and common sense. Every public clock should be under the immediate control of the public. We go further: Every clock in the metropolis of obvious public utility should be *brought* under the control of the public. In the absence of a central controlling body, surely horology is of sufficient importance in the metropolis to be able to secure local representation in vestrydom.

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The inquiry into the working of the Merchandise Marks Act by the London Chamber of Commerce has not, according to accounts received from all sides, been undertaken one minute too soon; and it is to be hoped that, as watchmaking is the only manufacturing industry which has been directly interfered with by special clauses in the Act, special attention is being, or will be, directed to its effect on and application to that industry.

An accepted doctrine in modern Parliamentary procedure has been that protective and repressive legislation is dead; yet the Merchandise Marks Act, if applied literally, would have the effect of severely handicapping English watchmakers in their competition with foreign producers—like all special Acts of Parliament, a good deal depends on the mode in which it is interpreted and administered.

But although the ethics of watchmakers are so paternally cared for by the Act, watchmaking is by no means the only trade affected; and as, happily, the shipping trades' interests are so seriously threatened by recent exploits of the Customs authorities, the former stand some chance of being relieved from some of their present disabilities.

We give in another column the translation of a letter from an officer of Customs to the Swiss Horological Journal, while the following is a list of a few only (as stated) of the seizures effected at the port of Harwich during two days of last month, as given by the correspondent of a contemporary:—

Buttons marked "Not metal," metal buttons marked "The fashion," trinkets marked "Rivetted Jet Trinkets," buttons marked "Superior quality," cards marked "By Royal Letters Patent," portions of sewing machines marked "Trade Mark Patent," buttons marked "Winged Crown," lamp wick marked "Super quality," toys bearing labels marked in English words, lace described "Oriental lace," clocks marked "Eight days' strike clock," case of gold leaf marked "Deep gold," knives marked "Superior cutlery," scissors with the word "Bleckmann," tools marked "H. Boker's best," paints marked "W. Bell & Co., Bombay," telephone instruments marked "Telephone Manufacturing Company," buttons called "Pearl buttons," cigar-ash trays bearing the English words, "Gentlemen are requested not to drop any cigar ashes on the floor, By order of the lady of the house;" metal buttons labelled "Fast shanks," sewing machines stamped "Wiseman's hand-stitch sewing machines," jewel cases with cartoons marked "Brooch cases," "Earring cases," clocks labelled on the cartoons "The Darwin 30-hour timepicce," clocks marked "Badewin clock manufactory," clocks marked "F. V," egg beaters stamped "Dover egg beater" and the words "Great American."

The following goods seized are all of German make, those described above being German, Swiss, Austrian, &c., combined:—

Buttons marked "Eagle make," tooth brushes marked "Extra fine," glass inkstands bearing the label "Inkstands," pins labelled "Pins."

Whether the Act is to result in a permanent benefit or otherwise to the trade is, as we have before pointed out, entirely dependent on the manner in which it is acted upon. The above is a slight indication of the present state of the official mind on the subject.

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## General Notes.

The Birmingham gold and silver spectacle makers have resolved to form a trade protection association, in order to endeavour to raise the price of the work and to look after the general interest of the trade.

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During the winter ten tons of coal per day are said to be used at the Waltham Watch Factory.

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A syndicate has decided to erect a gold-smelting works at Burryport, Carmarthenshire for the purpose of smelting gold. Several hundred workmen will, it is said, be employed in the smelting.

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Mr. David Glasgow, Sen., has resigned the vice-presidentship of the Horological Institute, as a protest against the last half-yearly meeting overriding his ruling at the annual general meeting last year, with respect to the election of officers.

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Notice is given by the Hydrographer that the time signals at Mount Wise, Devonport, now consist of a ball and gun, both automatically worked by a standard clock, which is daily synchronised with Greenwich by means of the electric telegraph.

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The second lecture of the Third Course of Cantor Lectures at the Society of Arts on the Modern Microscope (being a continuation of the recent course of Cantor Lectures on the "Microscope,") will be delivered on the 5th inst. by John Mayall, Junr.

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The Board of Trade returns issued last month show that the imports for January amounted to £34,802,988, an increase of £3,755,566 as compared with the same month last year. The exports for January amounted to £18,583,671, or an increase of £774,936 as compared with January, 1887.

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By decree of the Minister, Mons. A. H. Rodanet, President of the Paris Syndical Chamber of Horology, Officer of the Legion of Honour, &c., has been nominated Officer of Public Instruction, and Mons. Albert Villon, Mayor of St. Nicolas d'Aliermont, has been appointed Officer of the Academy.

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A gentleman of the name of James Moran, who made his way into the kitchen of a house in Gloucester Place, Marylebone, and was seen by a page who came down the steps to take up a silver mug, worth £5, explained at the Middlesex Sessions that he was a dealer in old clothes, and merely took up the mug out of curiosity. He was sentenced to three months' imprisonment.

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The will of the late Mr. Thomas Jessop, whose death we alluded to in our January issue, for many years head of the firm of William Jessop & Sons, engaged at Sheffield exclusively in the manufacture of steel, was proved last month. The gross value of the personal estate in England is sworn at £656,449. The probate duty amounted to £19,626. The value of the personalty in America is not yet ascertained. Mr. Jessop had, in addition, large freehold estates. He leaves £4,000 to the Jessop Hospital for Women, which he erected at a cost of £30,000.

James Taylor, *alias* Bearder, who was arrested in December on a charge of being concerned in a robbery at Melbourne, in which jewellery of the value of £1,000 was stolen, was on February 6 brought before the Birmingham magistrates, and, in the absence of the prosecutor, was released on his own recognisances, the police detaining about £200 worth of stolen property which was found in the prisoner's possession.

Fifteen stamps were at work during last month, at Mr. Pritchard Morgan's gold mines at Dolgelly, and crushing operations are now in full play. An Australian gold miner who has paid a visit to the Dolgelly mines says he believes the average yield will be about 6ozs. to the ton. He says the mistake the first prospectors made was to confine their attention practically to the surface. The deepest shaft hitherto sunk is 140 feet, but it is Mr. Pritchard Morgan's intention to descend 600 or 700 feet.

The Depreciation of Silver.—In the House of Commons last month the Chancellor of the Exchequer, in reply to Mr. Kimber, said he could not anticipate his Budget statement by indicating the intention of the Government with respect to the laws relating to the manufacture and sale of articles of silver plate in the United Kingdom, with a view to remove all hindrances to the consumption of the raw material, silver, for manufacturing purposes.

A number of competitive designs and models for the gift from the Corporation of the City of London to the Prince and Princess of Wales on the occasion of their silver wedding have, says *The Standard*, been submitted to the authorities, who have selected that of Messrs. Elkington & Co., (Limited). They have been ordered to produce a model in silver of the Imperial Institute, at a cost of five hundred guineas, which it is intended to present to the Princess of Wales in March next.

Mr. W. F. Nye of oleaginous renown, has just completed his new vial filler, upon which he was granted a United States' patent two years ago. The machine consists of a brass plate, covered by an enclosed pan, which has 144 tubes leading from it to the same number of bottles, every bottle being filled exactly alike, as each tube is fitted with a self-acting lever, which regulates the filling. The filler is arranged for one, two and three ounce bottles, and, it is said, thirty gross can be filled in one hour.

Since my last, says "Anglo-Australian" in the *European Mail*, some of the rubies which have been sent from South Australia have been shown to the Agent-General. Although not equal to the famous pigeon blood hue of the best gems, they are really very fine stones, and may be taken as coming between a Burmese and a Siamese ruby. There can be no doubt of their genuineness, for they have been carefully tested by a degree of heat that, were they only ruby garnets, would have reduced them to nothingness. The lowest price of these stones is 40s. a carat. By the way, I suppose everybody knows that the ruby is only a red sapphire.

The case of Howard *v.* Clarke, heard last month before Justices Mathew and Smith, was an appeal from the decision of a County Court in a case which was the first of the kind under the Pawnbrokers' Act of 1872. Some time ago a massive gold horse-shoe pin, set with seven diamonds, was stolen from someone in the neighbourhood of Nottingham. The police sent printed descriptions of the pin to the pawnbrokers. The plaintiff presented one he had got from a publican at the shop of the defendant, a pawnbroker, and the latter, thinking the article answered the police description, gave the plaintiff into custody. It turned out that the plaintiff acted *bonâ fide*, and that the pin he presented was not the stolen one. The plaintiff sued the defendant for false imprisonment, and the jury gave him a verdict for £25, on the ground that the pawnbroker acted without reasonable ground for suspicion. The Court sustained the appeal, holding that there was no evidence of want of reasonable suspicion.

The Diamond Market.—Although business has so far been better than it was this time last year, there is nothing very phenomenal being done. Medium quality goods sell best, but the prices to be obtained are very low, and the Dutch organ of the diamond trade says it requires a thorough knowledge of *rough* to guard against losses being incurred.

All the factories are going.

The buyers at *Paris* are mostly looking out for bargains on spec. There is a demand for the best stones, but prices offered are low.

The "Pembroke Castle," "Spartan," "Roslin Castle" and "Tartar" arrived at Plymouth during the month, and the London market has been very active, many foreign buyers are here and important sales have been effected. The prices coming from the fields are very firm at a somewhat higher rate.

Latest from *Kimberley* report increased activity, all classes of goods in demand. Home reports encouraging, and shipments profitable.

Silver.—Bars, 44$\frac{1}{16}$d.; Mexican dollars, 42$\frac{3}{4}$d.

## Trade Notes.

Mr. A. W. NEWBOLD, Junior, of 37, Spencer Street, E.C., requests us to state (in connection with our recent note respecting the award of prize medals at the Apprentices' Exhibition at Mile End), that the first-class silver medal for excellence of workmanship was gained by one of his apprentices.

The "Silver Wedding" jewellery of Mr. J. N. Masters, Rye, Sussex, should also not escape the attention of jewellers The designs are of marked originality and artistic merit; they consist of various appropriate combinations of the national emblems: Rose, Shamrock and Thistle; Prince of Wales' Feathers, &c., with suitable mottoes.

We call the attention of those manufacturers who are now seeking for a means of a more systematic and economic production of watches, to the new catalogue of the American firm of Messrs. Mosely & Co., of Elgin, Illinois, which is now before us. It contains a complete list of the lathes and adjuncts (on the well-known "Whitcomb" principle) manufactured by the Company, with other details that cannot fail to be instructive.

We have received from Messrs. Vaughton, of Gothic Works, Birmingham, their new illustrated catalogue and price list. Although the firm point out the impossibility of including every article they manufacture among the illustrations in the catalogue, the latter is very complete in this respect, and jewellers doing business in sporting localities with athletic clubs, etc., would do well to obtain it, before completing stocks for the forthcoming season.

The Report of the Directors of Messrs. Perry & Co. is just published. After deducting the usual payments amounting to £9,645, and adding the balance from last year, £475, there is shown to remain a balance of £13,523, with which it is proposed, after carrying £2,000 to the reserve fund, to pay a dividend at the rate of 5 per cent. on Preference and 10 per cent. on Ordinary shares for the year, the latter of which is the same as that paid for the last four years.

The celebration of the Prince of Wales' silver wedding is likely to produce as much stir in the fancy trades as did the past year of jubilation, and signs are visible in many directions of designers turning their attention to the fact. Among various specialties that have come under our notice, some very effective and elegant designs in photograph frames may be mentioned as deserving attention. They are called "The Prince and Princess" and are manufactured by Messrs. King & Sons, Goswell Road, E.C.

Messrs. Nicole Frères have on one of their price lists a quotation from the press to the effect that the difference between a musical box made by them, and one of common construction, is as great as that between an "Erard" pianoforte and one of those which Mr. Middlewick, in "Our Boys" would professionally pronounce to be a "Shop 'un." Certainly, some of the later productions of this firm are models of finish and development in many ways, perhaps the greatest advance being that of interchangeable cylinders, by means of which, what is practically a new musical box is obtainable at a small cost The extra cylinders are contained in a drawer in the box and can be readily changed at will by inexperienced persons.

# Birmingham News.

From Our Correspondent.

'TIS proverbial that every black cloud has its silver lining, and although the lining is not always visible, it is certainly consoling to accept the proverb as a fact to be proved sooner or later. The black cloud floating in the commercial sky of the jewellers' quarter is the fact that another manufacturer has filed his petition for liquidation, and to add to the blackness, there is a considerable amount of gossip abroad to the effect that there are others following, which piece of gossip may or may not have some foundation ; in fact, 'tis a weakness of the business man—this disposition to prophecy—and it always seems to be most rampant when it would be best if kept in the background, for although coming events may cast their shadows before them, yet shadows are very unstable things, and seldom prove anything better than a Will-o'-the-Wisp to those unfortunate travellers who are sufficiently credulous to believe all that they may chance to hear. The silver lining consists of the fact that the present catastrophe is not due purely and simply to bad trade, so much as to bad trading—obtaining customers by means of champagne suppers and other expensive and unbusiness-like performances, which never ends in a steady and reliable connection, as too many bad business men have already found to their cost. It is the steady, non-drinking, early-to-bed and early-to-rise part of the community that make money and pay their debts, while others are floundering through the bankruptcy court and complaining of bad trade. There are a good few of the steady, hard-working manufacturers still fairly busy, making overtime, and their men getting decent wages—these are they who go with the times and adopt new methods of working, new designs, and plenty of healthy activity.

* * *

Constant complaints of foreign cheap goods coming into the markets and causing a downward tendency in prices are still floating about, but we have the remedy in our own hands, as foreign goods stand a small chance of being sold as English make (thanks to the Merchandise Marks Act) ; let every Englishman be true to the cause and refuse to buy foreign manufactured articles. For instance, a number of the jewellers prefer French tools to our own make because they are cheaper. Suppose the public take a fancy to French jewellery—where are you then ? Oh ! Birmingham working men, say no more about your foreign competitors as long as you are so inconsistent ; you have the cure in your own hands, but if you will feed the foreigner you must not be surprised that he is willing to live upon you ; and yet you have a greater power in your own hands than any protective tariff could possibly wield.

I have before me a price list of French optical goods forwarded to me this morning by the manufacturer direct from Paris, and there are some wonderfully cheap lines in opera glasses, field and marine glasses, spectacles, &c. It would be worth while some of our makers who are suffering so keenly from this fact, making a deeper study of the matter. Why should the Frenchman be able to produce so much cheaper an article ? Do we really know why ? I am aware that numerous reasons are given, but are they the actual whys and wherefores of the case ? Why can the foreigner live so much cheaper than we can ? I am being informed that this is so daily, but I should like a little more actual proof of the fact.

* * *

I am constantly advising my jeweller friends and acquaintances who express the difficulty that they find in getting really new designs, to go to nature and make a closer study of her never-exhausted supply ; and if they will add to this a search after any art work of ancient nations or tribes of people, they will often be rewarded for their trouble. By the kindness of Mr. Dent, the Librarian of the Aston Free Library, I was able to make a close inspection of a small collection of some native handicraft, produced by the Australian Aborigines, at present on loan to the Library Committee, and was surprised to find a real work of art in the shape of a calabash knife ; it is very much like a modern paper knife in shape and would do very well for the purpose ; the handle, which is carved with some very quaint and appropriate detail—all the ornamentation being of such a nature as to assist in holding it firmly in the hand—is turned at a different angle to the blade, which gives the holder greater power when using it, and the article as a whole leaves little to be desired, and certainly contains a good many lessons applicable to modern work. I was unable to make a drawing of it at the time, but hope to be able to trespass upon the generosity of the owner so far as to do so at some future time.

The "Precious Stone" dealers are all more or less suffering by the failures of manufacturing houses ; as they give long credit, their accounts generally assume large proportions ; losses are correspondingly heavy and dividends of three and sixpence in the pound are something like equal to total loss. Some of them have been very "badly hit" lately, and long faces and short purses are the inevitable consequences.

* * *

I have been able at the last moment to make a drawing of the calabash knife referred to above.

Copper.—Great attraction, says a contemporary, is still centred in the copper market and the doings of the so-called French Syndicate, and prices are continually fluctuating. Under the circumstances, it is not surprising that consumers show no inclination to purchase except in such quantities as are for the moment required. Throughout the country the stocks of consumers have been very materially encroached upon of late, and are consequently getting low, so that much anxiety is being experienced in several quarters as to the probable state of the market a little time hence. There seems to be almost a general want of confidence in either the legitimacy or permanence of the rise, and the prevailing opinion is that prices will gradually drop until about £60 is reached for Chili bars. To show the uncertain state of the market and fluctuation of prices, it may be noted that in the early part of the last week of January one morning it was reported that transactions had taken place at £79, sharp cash ; but, while at first there were appearances of higher prices during the day, £77 7*s.* 6*d.*, sharp cash, was the price about middle day, and the afternoon was rather quiet, metal changing hands at £75 5*s.* At the close of the week prices were £73 12*s.* 6*d.* at one month, or £73 7*s.* 6*d.* cash.

## The Merchandise Marks Act.

THE official treatise on the Act by Mr. Howard Payn is now in the hands of the officers of the various Customs Houses. With regard to marks on goods which may be taken to indicate the place of origin, and which have up to the present been so little understood, Mr. Payn says :—

"The indication of origin may be direct or indirect. With regard to direct false indication of origin the matter is simple enough. If knives are imported marked Sheffield, when they have been manufactured in Germany, it will constitute fraud. In the case of indirect indications of origin, the matter is less simple. The use of the English language in descriptions, such as 'superfine make,' in goods coming from a foreign-speaking country would be a false indication unless accompanied by a counter-statement. The same observation applies to the use of single words, such as 'patent,' 'registered,' or 'warranted,' or English measures such as yards, feet, inches, or dozens, or abbreviations of such words. Words which might imply manufacture by English firms, such as 'and Co.' if the goods came from a foreign-speaking country, would also require a definite indication of manufacture abroad. As an instance of false indications in foreign languages, the description 'Paris mode' on goods brought from Germany would clearly be a misdescription, but such words would be legal if the goods came from France. Besides the use of the English language there may be other indirect indications, such as V.R., the Royal Arms, the Queen's Crown, the Lion of Scotland, the Harp of Ireland, or similar devices implying a national character. Such marks on goods of foreign origin must have some counter-statement, such as 'manufactured abroad' added to prevent an infringement of the Act. With regard to goods from America or other English-speaking country, in the case of towns having similar names to towns in this country, the place of origin must be distinctly indicated. The letters 'U.S.A.' would be a sufficient indication in the case of such American towns.

"False descriptions as to mode of manufacture or as to the material of which goods are composed, such as goods marked 'hand-made' when they are really machine-made, or 'cast-steel' when they are merely run metal, would render them liable to detention on importation, but, as a general rule, the Customs would only detain them upon information by persons affected."

Dealing with Sections 7 and 8 which refer especially to watches, he says :—

"The directions to be observed in applying the new law relate to—(*a*) Watch cases with assay marks imported alone; (*b*) like watch cases imported with the watches—that is to say, watches of foreign manufacture in them. If the cases are wholly unmarked, or are duly marked in accordance with the Order in Council, or with a foreign assay mark, and there is not in addition any wording on any part of the case proper, or on the dome, indicating make or produce in the United Kingdom, the goods may be delivered. If, on the other hand, there is any such wording the goods must be detained and the matter referred to the Board. If the cases are marked with the British hall-mark, as placed on watch cases made in the United Kingdom, the goods will be detained unless they are entered as 'British goods brought back,' in which case they will be admitted under the usual regulations. (*c*) If the cases are wholly unmarked or are marked either in accordance with the Order in Council, or with a foreign assay mark, or with a British assay mark as placed on a watch case made in the United Kingdom, and with an equally conspicuous statement of make abroad as regards the watch itself, either above or below the assay mark, and if there is no wording either as an addition on the case or dome or upon the watch itself, whether on the dial, or on the plate, or any part of the works, indicating make or produce in the United Kingdom, then the goods will be delivered. If, on the other hand, there is any such wording the goods will be detained, and the matter referred to the Board. If the cases are marked with a British assay mark as placed on a watch case made in the United Kingdom, and with no statement of foreign make on the case, as required, they will be detained as a seizure unless there is upon the dial of each watch, and also on the top plate (where the watch is of that construction) or on the bottom plate, visibly between the 'bridges,' an indelible and definite indication of the place or country of manufacture. Such a definition should contain the name of the place or country of origin; if, in addition, it contains the name of a place in the United Kingdom, as, for instance, 'Geneva and London,' or if there is anywhere on the watch an indication by figures, words, or otherwise that the watch might be the make of the United Kingdom, then in addition to the name of place of origin there must be a distinct statement that the watches were there made."

## The English Hall-Mark upon Foreign Watch Cases.

UNDER the above heading the *Journal Suisse d'Horlogerie* publishes a letter from a correspondent, of which the following is a translation :—

Mr. Editor,—Being Swiss—and, as such, having at heart the interests of my country, I should like, if possible, to give some information to those of my compatriots doing business with England.

Being employed in an English custom house, I am astonished at the quantity of merchandise which our little Switzerland sends here; but that which astonishes me still more is to see these goods, which, nearly all, do honour to the country which produces them, arrive here without marks or makers' names.

The French goods we receive here nearly all bear the name and address of the makers, and I think, Mr. Editor, that the English goods which you receive in Switzerland hear the name of English makers. Why are our Swiss afraid of making themselves known? It is what I do not understand.

Since the new law upon Merchandise Marks has been in force in England, I have seen many confiscations here. I think that our Swiss makers do not well understand all the aims of this law.

Lately we have received many cases of Swiss-made watches, the covers hearing a mark similar to the adjoining. It is not necessary to tell you


that these watches have been immediately confiscated for two reasons; firstly, the alloy 0·800 is not of sterling silver, and the English public is not supposed to know that there is any other silver than sterling silver; secondly, *Warranted Silver* are two English words, and nothing upon the watch indicates its place of origin; consequently, these two English words may very well denote that the watch has been made in England and be sold as such.

Other watches received here had neither English nor Swiss marks, but were marked *Patent Chronograph;* again two English words, and nothing to denote the place of origin of the watch, consequently they are again seized. Others had nothing upon the watch, but the case is marked: these are stopped; others yet had only *Fast* and *Slow* upon the regulator, still two English words not indicating the place of origin, these are confiscated.

All these stoppages could be avoided if our makers would put their name and address in the watch and on the case, so as to indicate the place of origin. Many manufacturers prefer to put *Swiss Make* upon their watches rather than their address.

All this that is applicable to watches is also so to musical boxes. Why do not our Genevese makers put their name upon the magnificent musical boxes which we receive? I do not comprehend.

We receive here quantities of cotton embroideries from St. Gall, silks from Zurich, &c. I have been here four years, and during that time I have seen hundreds of cases arrive, but not a single one having its contents marked with the name of a Swiss maker. I mistake, there are three exceptions: the potteries of Thoune, the machines of Zurich, and the aniline colours of Bâle; these three merchandises are marked with the names of the makers, but the cottons and the silks never. Some boxes of embroideries are marked *Swiss Embroideries*, two English words denoting the place of origin of the goods; but the greater part have only English words proving nothing, except that the goods have been made in England, and in virtue of this new law, the word *yard* is sufficient for their detention.

The ribbon makers are the first I have seen to have made a step in the right direction: two putting their initials and their address, the others putting *Swiss make* upon their boxes and ribbon rollers.

Hoping, Mr. Editor, that these indications will be of some use to your readers,

I am, &c.,
A Swiss.

## Lord Salisbury on The Merchandise Marks Act.

A PUBLIC meeting, convened by the London Chamber of Commerce, was held at the Cannon Street Hotel, on February 8, to consider the question of pirating English trade marks and names by foreign dealers, and the expediency of altering or modifying the Merchandise Marks Act, as a means of preventing the evil. Mr. Herbert Tritton presided, and there was a very large attendance, among those present being Mr. Heneage, M.P., Mr. Howard Vincent, M.P., and Mr. McArthur, M.P. The Chairman, in opening the proceedings, said that while the Chamber of Commerce had not adopted any position hostile to the principle of the Merchandise Marks Amendment Act, there could be no doubt that its effects had been detrimental to different portions of the trading community, both with respect to some of the details of its provisions and in regard to the way in which the measure had hitherto been administered. The Secretary (Mr. R. B. Murray) read the following letter that had been received from the Under-Secretary for Foreign Affairs on behalf of Lord Salisbury :—

Foreign Office, *February 7.*

Sir,—I am directed by the Marquis of Salisbury to acknowledge the receipt of your letter of the 18th ult., on the subject of the probable effect on British interests in certain cases of the Merchandise Marks Act, 1887. In reply, I am to state that the Act of last session was passed with the view of preventing the fraudulent use of marks, and that it materially strengthened the power of the Customs authorities to stop the entry of goods so marked in this country. It was foreseen by Her Majesty's Government that where foreign goods had been improperly marked and forwarded through this country from abroad for transhipment to the Colonies or to foreign countries, there might be some risk that the difficulties interposed by the new Act would lead to the importation into such Colonies or foreign countries of the goods wrongly marked directly from the country of origin. To that extent the shipping trades may be affected. But this possibility was foreseen, duly weighed, and was regarded by Her Majesty's Government as being an inferior consideration to the purification of trade. One of the main principles of the Act, as the London Chamber of Commerce is aware, is that every country should have the credit and advantage of its own manufactures, and against that principle it is not understood that the Chamber contend. I am also to inform you that a circular was addressed on October 8 last to Her Majesty's representatives in those countries who are parties to the International Union for the Protection of Industrial Property, enclosing copies of the Merchandise Marks Act, 1887, with copies of a Memorandum explaining the nature of its provisions, for communication to the Governments of those countries. I am to enclose a copy of the Memorandum in question for the information of the London Chamber of Commerce. It was also pointed out to Her Majesty's representatives that, in framing the Act, Her Majesty's Government had sought to protect not only the interests of British subjects, but also those of subjects of foreign States, by providing remedies against the fraudulent practices in question, whether committed to the detriment of British or foreign manufacture, and that Her Majesty's Government felt confident that the passing of the Act would be recognised by foreign Governments as an attempt to carry out in their complete spirit the principles of the Union, of which the main motive is the prevention of fraudulent practices of this description. And they were instructed to state, in communicating the Act and Memorandum, that whilst Her Majesty's Government invited a careful consideration of the Act, they appealed with some confidence to the States comprising the International Union to take any steps which might be in their power to initiate legislation in the same direction, whereby reciprocal protection might be afforded abroad in similar circumstances to British subjects. I am to add that, with a view to minimise the present evil, the British Colonies have been invited to adopt a law similar to the Imperial Act.—I am, Sir, your most obedient humble Servant, (Signed) James Fergusson.

A communication had also been received from the London, Chatham and Dover Railway Company, stating that a large quantity of goods which were formerly sent by that line *en route* for Liverpool were now sent direct to America from German ports, in consequence of the provisions of the Act. Mr. Phillips moved—"That this meeting approves of the initiative taken by the London Chamber of Commerce in giving the commercial community an opportunity of expressing its grievances *re* the Merchandise Marks Act, and requests the council to take such steps as may appear requisite to enable the Act to operate with the minimum of detriment to the distributing interests." Mr. Buckingham, in seconding the motion, said that the Act would continue to be necessary as long as British traders had foreign competitors who were prepared to adopt dishonest methods of selling their goods. Several amendments were proposed, but not agreed to; and after considerable discussion the original motion was unanimously carried. On the motion of Mr. W. Leaf, seconded by Mr. V. Barrington, a further resolution was passed welcoming the formation of an association (the Merchandise Marks Association), to obtain and distribute information as to the working of the Act, and to protect the interests of those affected by it, whether by test cases or by promoting such amendments in the law as might prove necessary.

## Fraud on Messrs. Grant and Peake.

AT the Marlborough Street Police Court last month, Charles Max Schroder, 37, a well-dressed man, from Sydney, New South Wales, having no occupation, was brought up before Mr. Newton, in custody of Inspector Jarvis, of Scotland Yard, on the charge of feloniously forging and uttering certain acceptances to six bills of exchange, amounting in the aggregate to over £2,200, in the year 1886, with intent to defraud William Henry Peake, a jeweller, of Gerrard Street, Soho.—According to the opening statement of Mr. Inman, solicitor (from the office of Messrs. Wontner & Sons), who prosecuted, it appeared that in July, 1886, defendant absconded, and for a long period nothing could be ascertained as to his whereabouts. Recently, however, it was discovered that he was living near Sydney, where he was arrested by Inspector Jarvis and brought back to this country. As the prisoner had only arrived in London on the previous afternoon, he (Mr. Inman) proposed then only to read the sworn information on which the warrant was granted, after which he would ask for a remand. The information stated that the prosecutor carried on business in Gerrard Street, Soho, as a jeweller, under the style of Grant & Peake. He became acquainted with the prisoner some years ago in reference to a bill for £110, which had been passed over to Mr. Peake for value by a Mr. Thomas, of Rue Castiglione, Paris. This bill was accepted by Schroder, who called upon the prosecutor and made various representations in respect to his monetary position, and induced him to hold over the bill and at the same time to sell him a bracelet. He informed Mr. Peake that under the will of his grandfather, he was entitled on the death of his father and mother to a very large sum of money—many thousands of pounds—and that he was at liberty to raise money on his reversion. Owing to his statement that he was negotiating a considerable advance upon his reversion, the prosecutor agreed to accept—and did accept—drafts which the prisoner should draw to the extent of over £3,000. These the accused was to discount and to take them up at maturity. Parcels of jewellery were also sold to Schroder to the extent of over £1,000, for which he gave his acceptances. The acceptances were handed to the prisoner, and were discounted by him through a Mr. Magnin, of the Boulevard Sebastopol, Paris. Some of them were subsequently renewed, but ultimately when called upon Schroder failed to take up the bills, whilst the acceptances which he gave to the prosecutor, after being several times renewed, were dishonoured. As Mr. Peake had to pay those which he had given early in July, the prisoner was owing him, without the expenses of certain actions that had been brought in Paris to recover the money, the sum of £4,400. From time to time the accused promised that he would pay, and still kept up the statement that he was negotiating a large advance on his reversion, promising that he would pay the debt on July 30. On the 6th of that month Schroder called upon the prosecutor in a state of great agitation, and said that having been pressed for money, and in anticipation of the certainty of getting the advance, he had forged the names of Grant & Peake to acceptances which he had discounted in Paris, and which were due on the following day, and had been made payable at the Argyll Street Branch of the Union Bank. He added that he believed his uncle would pay them, and begged Mr. Peake to take no action in the matter, saying that the whole indebtedness would be cleared off. The accused wrote a memorandum to the effect that the bills were not genuine, but although his uncle was communicated with, nothing was done in the matter, and Mr. Peake therefore gave notice to his bankers that the six bills referred to, did not bear the firm's

signature, and had been drawn without their authority. Five of them were presented during the day, and he (the prosecutor) again repudiated them, hearing afterwards that they had been taken up by Schroder's uncle. Before the end of July, however, he heard that the accused had left the country without first making arrangements, and therefore, in order to prevent a repetition of the forgery, he applied for and obtained a warrant for Schroder's arrest. It had been ascertained that accused had no power to part with his reversion without his parents' consent, and that had not been obtained.—At the conclusion of the reading of the information, the prisoner was remanded for a week.

On the remand, Mr. St. John Wonter conducted the prosecution, and Mr. Gill, barrister (instructed by Mr. C. O. Humphreys), defended.—William Henry Peake having been examined, and other evidence of a formal character been given — Inspector Jarvis, of Scotland Yard, said that on the warrant being read, the accused remarked that he did not understand what it was for, and on it being further explained, he said "I have had a good deal of business with Mr. Peake." He admitted, also, the authenticity of certain documents, but said the confession was a forgery.—Mr. Gill remarked that he did not propose to address the magistrate for the defence, which would be reserved.—The prisoner was thereupon committed for trial.

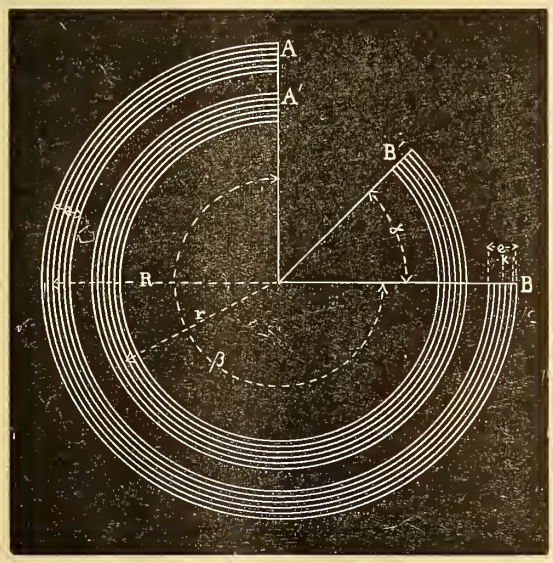
## The Theory of Adjustment.

By M. L. Lossier.

After the Memoir of M. Jules Grossmann.—From the *Journal Suisse D'Horlogerie.*

THIRD ARTICLE.—*(Continued from page 120.)*

SECTION 6.—Let us see now what takes place in a spring of circular form. Let *A B* (fig. 5) be a spring which we assume is composed of five turns each of 0mm.,03 in thickness; its radius, *R*, measured to the middle of its thickness* is 10mm. As represented in the diagram, it is free and without tension.




We will designate by $\beta$ the angle formed by the spring around its centre, *o*, which is here three-quarters of a turn. The length of the lamina from the middle will be then three-quarters of a circumference of 10mm. radius, or:—

$$L = 10 \times \frac{3 \times 3.1416}{2} = 47^{mm.}, 124,$$

or, algebraically:—

$$L = R\,\beta.$$

* The thickness of the spring has been, in the figure, considerably exaggerated, in order to show more clearly the division of the coils.

The length of the exterior lamina will be three-quarters of a circumference of a radius 10mm., plus two thicknesses of laminæ, or

$$(10 + 0.06)\,\frac{3\,\pi}{2} = 47^{mm.}, 407,$$

or, calling the length of any lamina $L'$, and the distance from the middle of this lamina to that of the middle lamina $k$:—

$$L' = (R + k)\,\beta. \qquad (7)$$

Bending now the spring so that it includes a greater angle, $\beta + \alpha$, or seven-eighths of a turn, the end *A* will go to *A'*, and *B* to *B'*; the radius *r* will be smaller, the exterior lamina will become longer and the interior lamina will become shorter; the middle lamina, on the other hand, will preserve its same length, which we have found equal to $R\,\beta$, and which, expressed with the new radius *r* for unit, will be:—

$$L = r\,(\beta + \alpha);$$

then

$$R\,\beta = r\,(\beta + \alpha),$$

from whence

$$r = \frac{R\,\beta}{\beta + \alpha}, \qquad (8)$$

or, in figures:—

$$r = \frac{10 \times \frac{3}{2}\,\pi}{\frac{7}{4}\,\pi} = \frac{60}{7} = 8^{mm.}, 57.$$

The length $L''$ of the exterior lamina becomes:—

$$L'' = (r + k)\,(\beta + \alpha);$$

or, substituting for *r* its value taken from the equation (8),

$$L'' = \left(\frac{R\,\beta}{\beta + \alpha} + k\right)(\beta + \alpha)$$

or,

$$L'' = R\,\beta + k\,\beta + k\,\alpha. \qquad (9)$$

The lengthening that has taken place is then:—

$$L'' - L' = R\,\beta + k\,\beta + k\,\alpha - R\,\beta - k\,\beta,$$

or,

$$L'' - L' = k\,\alpha;$$

or, in figures:—

$$0{,}06 \times \frac{\pi}{4} = 0^{mm.}, 047. \qquad (10)$$

This lengthening is positive, but it will become negative for *k* negative, that is to say, for the interior laminæ; it changes likewise its sign accordingly as the angle $\alpha$ adds to or diminishes the angle $\beta$.

A *negative lengthening* is a *shortening.*

If the two terms are negative, their product is naturally positive.

It is to be remarked that the lengthening is independent of the radius *R*, and consequently of the curve of the spring, which may be circular, cylindrical, spiral or otherwise.

To ascertain the effort exerted, we have only to substitute in the equation (6)* for the term *l* its value $k\,\alpha$, and we shall have

$$P = \frac{E\,k\,\alpha\,s}{L}. \qquad (11)$$

In figures, taking the width of the spring = 1mm., *s* will be worth 0mm., 03, and the effort exerted by the single exterior lamina will be:—

$$P = \frac{26{,}000{,}000 \times 0,\ 047 \times 0.03}{47,\ 407} = 773 \text{ gr.}$$

The interior lamina tends to lengthen itself, and will inversely exert the same effort.

The moments of the forces will be: for the exterior lamina,

$$P\,(r + k),$$

and for the interior lamina,

$$-P\,(r - k).$$

* See Erratum, page 120.

Their sum will be then :—

$$m = P\,(r + k) - P\,(r - k),$$

or

$$m = 2\,P\,k; \qquad (12)$$

it is independent then of the radius of the spring.

Substituting its value for $P$ (11), we shall have :—

$$m = 2\,k \times \frac{E\,k\,\alpha\,s}{L}$$

or,

$$m = \frac{2\,E\,k^2\,\alpha\,s}{L}.$$

This equation represents the moment of simultaneous efforts, exerted in inverse senses, of an interior lamina and an exterior lamina at equal distance from the middle lamina.

The distanee $k$ from the middle of the middle lamina to that of the first or of the fifth, is equal to the thickness of two laminæ, and, if we call $l$ the total thickness of the spring, $k$ will be

$$k = 0.4\,e \quad \text{and} \quad k^2 = 0.16\,e^2.$$

For the second and the fourth lamina the distanee $k$, which is that of one thiekness, becomes

$$k = 0.2\,e \quad \text{and} \quad k^2 = 0.04\,e^2;$$

the sum of the two values of $k^2$ is then :—

$$0.16\,e^2 + 0.04\,e^2 = 0.2\,e^r.$$

The total moment of the effort exerted by the spring, and which is the same thing as we have designated at seetion 5 by $M\,\alpha$, will thus be :—

$$M\,\alpha = \frac{2\,E \times 0.2\,e^2 \times \alpha\,s}{L}.$$

The section $s$ of each coil being equal to its thickness, $0.2\,e$, multiplied by the height of the spring $h$, or

$$s = 0.2\,e\,h,$$

we have, by substituting

$$M\,\alpha = \frac{2\,E \times 0.2\,e^2 \times \alpha \times 0.2\,e\,h}{L},$$

or,

$$M\,\alpha = \frac{0.08\,E\,h\,e^3\,\alpha}{L}.$$

We have obtained the figure 0.08 by dividing the spring into five laminæ, but if we make the calculation from dividing the spring into a large number of very fine eoils, we shall arrive at a more exact figure of

$$0.08333\ldots \text{or } \tfrac{1}{12}.$$

The formula giving the moment of force of a spring becomes finally :—

$$M\,\alpha = \frac{E\,h\,e^3\,\alpha}{12\,L}. \qquad (14)$$

$E$ = coefficient of elasticity.
$h$ = width of the spring.
$e$ = thickness of the spring.
$L$ = length of the spring.
$\alpha$ = angle which the balanee has turned.

Or, figuring from the numerical example that we have taken :—

$$M\,\alpha = \frac{26{,}000{,}000 \times 1 \times 0.0034 \times 0.7854}{12 \times 47.124},$$

or,

$$M\,\alpha = 122 \text{ grammes}.$$

In other words, to make the spring bend one-eighth of a turn, it would necessitate, on an arbor of $1^{mm.}$ radius, an effort of 122 grammes ; or, on a barrel of $10^{mm.}$ radius, $\frac{122}{10} = 12^{gr.}, 2$.

By eliminating $\alpha$ from the equation (14), we shall have :—

$$M = \frac{E\,h\,e^3}{12L}, \qquad (15)$$

which is the algebraical expression of the *moment of elasticity*.

The equation (14) may also be employed for calculating the force of a mainspring. The angle $\alpha$ becomes then very large, being sometimes as much as $2\,\pi$ that there are turns, less the turns the spring makes when it is entirely developed.*

*Numerical Example.—Being given a mainspring of $628^{mm.}$ in length, $0.18^{mm.}$ in thickness and $2.23^{mm.}$ in height, to calculate its force when fully wound up.*

In the free state, and without the barrel, the spring makes $5\frac{1}{3}$ turns ; rewound it makes 18.

The angle $\alpha$ will be equal to

$$(36 — 10\tfrac{2}{3})\,\pi = 25\tfrac{1}{3} \times 3.1416 = 79.59.$$

We shall have then :—

$$M\,\alpha = \frac{26{,}000{,}000 \times 2.23 \times (0.18)^3 \times 79.59}{12 \times 628},$$

or,

$$M\,\alpha = 3571^{gr.}, 2.$$

Direct experience has demonstrated that, in order to hold in equilibrium the wound up spring, it was necessary to suspend to a lever $123^{mm.}$ in length, fixed to the square of the arbor and carefully balanced, a weight of 29 grammes,

The moment of this force was then :—

$$29 \times 123 = 3567 \text{ grammes},$$

a figure very near to that found by the calculation.

*(To be continued.)*

## New Book.

The "Watchmaker's Handbook,"† translated from the French of M. Claudius Saunier by Messrs. Julien Tripplin, F.R.A.S., and Edward Rigg, M.A. (which has, since the first edition was published by Mr. Tripplin in 1881, been acknowledged as the most completc work of the kind in the English language), has now reached a seeond edition, and the translators are to be eongratulated upon the great improvements, typographically and otherwise, effeeted in the new issue, the text of which is well illustrated by numerous woodcuts. In the present edition such corrections as were found necessary on a careful revision of the work have been made; but, as the authors state, these have been, in nearly all cases, of an unimportant character, which speaks well for the care with which the former edition was prepared. Nevertheless, a great many valuable additions have been made to the book, which is further brought up to date by an appendix eontaining an account of advances made in relation to watchmakers' tools and other matters since the first edition was published. The "transition" state, as it has been called, of the English watch trade, renders the present appearance of the book particularly well-timed. As it is eminently praetieal, notwithstanding the comprehensiveness of the ground travelled over, no watchmaker who aspires to thoroughness can afford to be without it, and the publishers may confidently look forward to a large sale and a speedy demand for a further edition.

## Ancient Microscopes.

One of the most interesting of the series of Friday evening leetures at the Royal Institution was that on the above subjeet delivered last month by Mr. Frank Crisp, Viee-President and Treasurer of the Linnæan Society, and one of the secretaries of the Royal Microscopieal Soeiety, while its popularity was attested by the numerous audience. Mr. Crisp is well known to possess one of the finest collections of microseopes in the world, and to have spent a fortune in making it; and the members and friends were aware also that the lecture would be illustrated by rare speeimens of microscopes of bygone make.

* In order to obtain an exact calculation, it is necessary that the spring had been previously wound up in a barrel, then set free. The number of turns that it makes then (permanent curvity) is always greater than it had on coming out of the maker's hands.

† Price 9s. London : Crosby Lockwood & Son, 7, Stationers' Hall Court, E.C.

The audience spent a delightful hour in front of these strange scientific instruments, under the genial guidance of the lecturer, who explained that a more correct title for his address would have been, "Ancient Microscopes in their relation to Modern Thought." Regarding the word "ancient" as, after all, only a relative term, Mr. Crisp stated that from the microscopist's point of view he designated as ancient those persons who lived more than 100 years ago, and those microscopes which were made in or before the last century. Before discussing the merits and shortcomings of their ancestors modern microscopists were invited to remember what the essentials of a microscope really are. To compare what was with what is requires a standard. For all present purposes Mr. Crisp therefore defined a microscope as a thing that magnifies, at the same time admitting that scientifically such a description was both inexact and incomplete. To assist in the work of comparison there was placed in front of the lecturer a typical large microscope of the present day with its four essential parts: the general support of the instrument, the stage on which the object is supported, the illuminating mirror, and the magnifying lenses. This typical microscope, having the three special features of stability, subservience of everything to utility, and absence of any fanciful or incomplete arrangements, certainly looked, what it was, a costly and beautiful specimen of the modern instrument, with its manifold developments. To some, Mr. Crisp remarked, it might seem as if the glittering appearance of the instrument was intended to please the eye, but as a matter of fact there was nothing about it that was designed for ornament or to gratify æsthetic taste. When microscopes were first made, although it was reckoned an essential in the construction of a telescope to have a firm foundation, the principle was not applied to them. The difference between the instability of the old and the substantial foundations of the new was apparent when the lecturer passed from his modern type to the ancient forms around it. The collection represented but a small proportion of the microscopes that had been described and figured, as a reference to the books placed by Mr. Crisp upon the library table showed. Looking at these antique specimens, one could not fail to be struck with their extraordinary diversity. They were made of paper, parchment, leather, wood, and even tortoise-shell; and some of them were profusely ornamented. The most remarkable in this respect was a microscope which belonged to Pope Benedict XIV. at the end of the 17th century. The instrument is fixed to the top of a square box or cabinet, ornately decorated with the Papal insignia. Even the holder for the objects and the tube of the microscope are richly ornamented, while the inside of the cabinet and the drawer are lined with silk. A Roman ormolu microscope Mr. Crisp likened to some of our cheap upholsterer's work, upon which a piece of brass or ormolu is clapped on wherever it can be made to stick. One of the ornamented examples looked not unlike a Queen's reading lamp in general shape. The Jena tripod is a curious design with an elaboration of paint and carving which Mr. Crisp claimed as a triumph of meretricious decoration. There were eight instruments in succession pointed out in all of which ornamentation was the prominent feature, and one of them (a De Chaulnes) had a tube of tortoise-shell. Judging by a scientific standard, the lecturer concluded that the æsthetic tastes of the old opticians led them far astray from their proper path. The microscopes seemed to have been built to give the least possible trouble when the time came for them to tumble down. There was a Divini, for example, which a breath of wind would blow over. The great difficulty of the "ancients" was the illumination of the object. The mirror of the modern microscope is one of its most important developments, and its adjustment one of the arts to which the early attention of the student is directed. The old microscopists of course knew about the laws of the reflection of light, but their microscopes were made without mirrors. A similar lack of practical genius was also displayed in focussing. The unsteady movements of an elegant ebony and ivory, and a tall wooden microscope of Italian make, were made to point the moral. Mr. Crisp, indeed, conclusively proved that whatever the "good old times" might have been in other respects, they left much to be desired in the condition of microscope-making. At the same time the old makers deserve all credit for what they did with their defective tools; and they never arrived at the absurd degree of specialisation characteristic of the present. Some highly effective illustrations on the screen added to the appreciative enjoyment of the lecture, which was delivered extemporaneously, and was in parts very humourous. Altogether there were 300 of Mr. Crisp's microscopes shown in the lecture theatre or library—to use Mr. Crisp's words, "many of them rescued from attics and dustbins all over Europe."

## The Lever Escapement

### CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

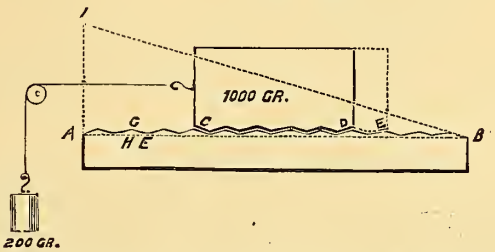
By M. L.-A. Grosclaude, Professor at the Geneva School of Horology.

(Translated from the French.*)

*(Continued from page 121.)*

LET us now try to give an explanation of friction corroborating the results that have been obtained by practice. To what cause is attributable the resistance to one body's sliding upon another? It is that the surfaces are not perfectly polished: that is to say, that they are covered with an infinity of little projections which, catching in one another, force the mobile body to rise a small distance in order to pass from one projection to the other. Seen very much magnified, we can imagine the surface upon which friction occurs to be in the form of the line A B (fig. 15), where the projections are represented

*Fig. 15*




by a regular succession of inclined planes. Upon this surface let us place a body having a similar uneven surface, C D. Let us admit that by experiment a coefficient of friction of 0,20 has been found; which means that in order to make a body weighing, say 1,000 grammes slide, an effort of $1{,}000 \times 0{,}20 = 200$ grammes is necessary. If we give to our little inclined planes a slope of twenty-hundredths, or of one-fifth—that is to say, of which the height G H is the fifth of the base H F—we shall have to exert absolutely the same effort to cause the sliding. We may then consider friction as the effort required in order to cause a body to ascend an inclined plane, B 1, of which the slope will be equal to the coefficient of friction.

If our argument is correct, the work dispensed in order to operate the sliding should be equal to that required for making the body ascend the length of the inclined plane having the same activity as that of our little projection. This is in effect the case, since the effort of friction, 200 grammes, multiplied by the distance A B, traversed by this effort, is equal to 1,000 grammes raised to the height A 1, which is the fifth of A B.

The foregoing leads to the fact that if the surface were theoretically smooth, friction would not exist. Thus, the friction of molecules with one another is *nil;* resistance to sliding only exists because the inequalities have to pass by other inequalities, and thus to force the body to rise.

That friction produces wearing and heating is explained by the fact that the projections fall again at each instant to the bottom of the inclined planes, the result being shocks which produce the two effects in question.

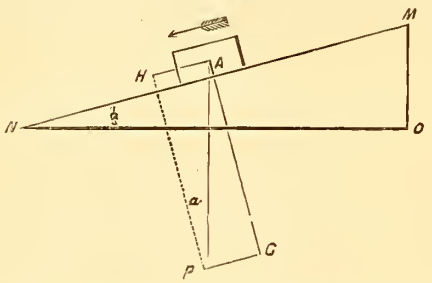
* We are informed by M. E. Gardy that the above article was originally written for the *Journal Suisse d'Horlogerie;* our translation is from a pamphlet published in Geneva by M. Georg.

We will now return to the principles of friction and see if they are verified by our theory of inelined planes. One of these prineiples says that friction is proportional to the weight, or, better, to the pressure, where the surfaees in contaet are not altered. In effect, if instead of 1,000 grammes we have 2,000, we shall have to raise a double weight to the same height, in whieh case we shall have done double the amount of work.

Let us now extend the surfaee by adding another projection, D E; the body will not by that have to rise any higher when the sliding takes plaee. We have, then, here the confirmation of the prineiple that the extent of surfaces in contaet has no effect upon the resistanee to be overcome. If the body travels over the space A B in a quicker or slower time, the work expended will remain the same; but the work will be so much the greater as the number of projections is inereased. This gives us the principle that the effort is independent of the speed, but that the work is proportional to the distanee travelled over by the rubbing surfaee. If we assume now that there is a great speed, and that some projections are not found in a right line with the others, it may be that, given the inertia of matter, the moving body passes above a eertain number of these projeetions, which would eonfirm the fact that, in great speeds, the work of friction is a little less.

Let us eonsider now the case of a body sliding the length of an inelined plane, noting the friction which must necessarily result. If the body A (fig. 16) weighs $p$ grammes, we take a

Fig. 16




linear length, A P, equal to $p$ in the dirceion of gravity, sincc we shall resolve this force, by means of the parallelogram of forees, into two others—the one, A G, acting perpendicularly, the other, A H, parallel, to the inclined plane. The foree which tends to make the body A descend is represented by A H, and the frietion, which acts in the contrary way, is obtained by multiplying the pressure A G by the eoeffieient of frietion which we will call $f$, A G $\times$ $f$. The difference will give us the intensity of the real foree which makes the body descend the length of the inelined plane. But there must be an instant when the friction will be sufficient to prevent the body from sliding. In this particular ease it is necessary to have—

$$A\,H = f \times A\,G.$$

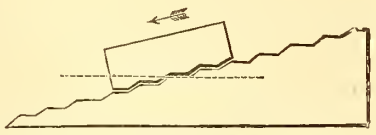
If from thence we seek the value of $f$, we find:

$$f = \frac{A\,H}{A\,G} = t\,g\,\alpha$$

designating by $\alpha$ the angle A P H, or that formed by the inclined plane with the horizon, as M N O. This angle is called *the angle of sliding*, and is independent of the weight of the body.

If we represent *de novo* our inelined plane by a rough surface (fig. 17), we shall see that we shall obtain the sliding at the

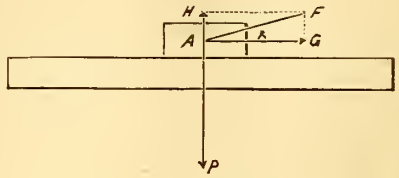
Fig. 17



instant the faee of the projection will occupy a horizontal position, if this face makes with the plane an angle equal to that whieh the plane makes with the horizon; consequently its slope will here be again equal to the coeffieient of frietion.

Let us renew our first ease of a body sliding upon a horizontal plane (fig. 18), and ask ourselves in what direetion it

Fig. 18




must act in order that the resistanee due to friction be a minimum. Should this direction be horizontal? We shall see it should not. If we act in a direction and with an intensity represented by A F, we shall resolve this force into two others: the one, A G, parallel, and the other, A H, perpendicular, to the plane; this latter diminishing the pressure A P. It is now equal only at A P — A H, and the friction to be overcome will be this last, multiplied by the coeffieient of frietion, or $f \times (A\,P - A\,H)$. In order that the sliding take place, we require the equation

$$A\,G = f \times (A\,P - A\,H). \qquad (1)$$

But we can replaee A G and A H by their values, expressed by means of the foree A F and of the angle $\alpha$, that makes this force with the plane, thus:

$$A\,G = A\,F \times \cos\alpha,$$
$$A\,H = A\,F \times \sin\alpha;$$

substituting these values in the equation (1) it becomes:

$$A\,F \times \cos\alpha = \times (A\,P - A\,F \times \sin\alpha),$$

from whence is obtained:

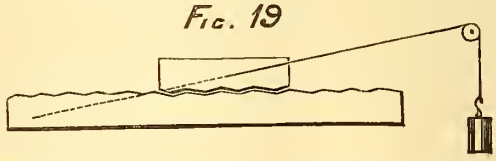
$$A\,F = \frac{f \times A\,P}{\cos\alpha + f \times \sin\alpha.}$$

This fraction may become small in three cases: when the coeffieient of friction $f$ and the weight A P are small, this is well authentieated; but also when the denominator $\cos\alpha + f \times \sin\alpha$ becomes the greatest possible: this will be when

$$f = t\,g\,\alpha,$$

a result that is easily obtained by the differential calculus. We see here, then, that in order that the effort be the most feeble possible, we must aet in a parallel direction, not to that of the surfaee itself, but to that of the face of the projection (fig. 19),

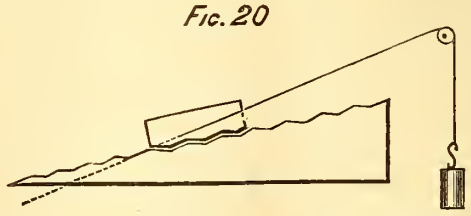
Fig. 19



this representing always as pent the coefficient of friction.

It will equally be demonstrated that, in order easily to obtain the sliding of a body upon an inclined plane (fig. 20), it is

Fig. 20



necessary to act in a direction whieh makes, with the inclined plane, an angle of which the trigometrical tangent is equal to the coefficient of friction.

These examples show that, when desired, the friction can be represented by an inelined plane whose slope represents the coefficient of friction.

From the foregoing it is easy to comprehend the effect that a liquid substance interposed between the rubbing surfaces produces ; in effect, it fills up the crevices and thus diminishes the roughness of the surface.

Better than this : if a hard grease is employed, friction properly so called disappears completely ; and if there still remains a resistance to overcome, it is because the greased molecules possess a cohesion known as viscosity of oils, which then takes the place of friction. So we see, in short, that the friction of a greased point ought to be the same as that of a dry surface.

*(To be continued.)*

## Royal Observatory, Greenwich.

### ANNUAL TRIAL OF CHRONOMETERS, 1887.

| NAME OF MAKER. | No. of Chronometer. | Greatest Difference between one Week and the next. (*b*) | Difference between the Greatest and Least Weekly Rates. (*a*) | Trial No. $a+2b$ |
|---|---|---|---|---|
| | | s. | s. | |
| Uhrig | 452 | 3·2 | 6·8 | 13·2 |
| Mercer | 4513 | 3·7 | 10·2 | 17·6 |
| Kullberg | 2517 | 4·1 | 9·8 | 18·0 |
| Uhrig | 482 | 4·8 | 10·7 | 20·3 |
| Kullberg | 2759 | 3·9 | 13·0 | 20·8 |
| J. Poole and Co. | 5818 | 7·2 | 10·1 | 24·5 |
| Edward and Son | 4756 | 7·2 | 14·4 | 28·8 |
| Blair | 1887 | 10·5 | 12·5 | 33·5 |
| Blair | 1888 | 7·5 | 19·2 | 34·2 |
| Isaac | 1780 | 9·0 | 16·3 | 34·3 |
| Mercer | 4824 | 8·7 | 21·6 | 39·0 |
| Pyott | 886 | 11·2 | 17·6 | 40·0 |
| Penlington | 2515 | 9·5 | 29·9 | 48·9 |
| Penlington | 2517 | 10·8 | 31·0 | 52·6 |
| Moore | 5736 | 15·5 | 22·1 | 53·1 |
| Brockbank and Co. | 2063 | 15·8 | 21·6 | 53·2 |
| Whyte and Co. | 2828 | 14·9 | 23·7 | 53·5 |
| Sewill | 4516 | 18·0 | 19·2 | 55·2 |
| Isaac | 1789 | 16·2 | 24·2 | 56·6 |
| Moore | 5754 | 19·0 | 22·4 | 60·4 |
| Pyott | 902 | 14·5 | 32·1 | 61·1 |
| Sewill | 4518 | 21.7 | 27·6 | 71·0 |
| M. F. Dent | 29564 | 22·9 | 27·5 | 73·3 |
| Whyte and Co. | 2825 | 15·7 | 43·3 | 74·7 |
| Gardner | $\frac{5}{38922}$ | 14·3 | 46·9 | 75·5 |
| Oram and Son | 18431 | 14·3 | 47·7 | 76·3 |
| Klean and Co. | 1007 | 30·2 | 53·2 | 113·6 |
| Schoof | 6059 | 57·5 | 66·3 | 181·3 |

The trial occupied 29 weeks and the temperature varied from 37° F. to 99° F.

THOMAS LEWIS,
*For the Astronomer Royal.*

Royal Observatory, Greenwich,
*February* 23, 1888.

## On the New Artificial Rubies.

By George F. Kunz.

THE subject of artificial gems is at the present moment of considerable interest, not only financially, but also as furnishing an example of the manner in which the microscope is constantly called into use by almost every profession. Early this summer the Syndicate des Diamants et Pierres Precieuses were informed that certain stones, which had been sold as rubies from a new locality, were suspected to be of artificial origin. They were put upon the market by a Geneva house, and it was surmised that they were obtained by the fusion of large numbers of small rubies, worth at the most a few dollars a carat, into one fine gem worth from 1,000 dols. to 2,500 dols. a carat.

Some of these artificial stones were kindly procured for me by Messrs. Tiffany & Co. I was not, however, permitted to break them for analysis, to observe the cleavage, or to have them cut so that I could observe the optical axes more correctly. I would at any time have detected the artificial nature of this production with a mere pocket lens, as the whole structure is that peculiar to fused masses. Examination elicited the following facts : The principal distinguishing characteristic between these and the genuine stones is the presence in them of large numbers of spherical bubbles, rarely pear-shaped, sometimes containing stringy portions showing how the bubbles had moved. These bubbles all have rounded ends and present the same appearance as those seen in glass or other fused mixtures. They are nearly always in wavy groups or cloudy masses. When examined individually they always seem to be filled with gas or air, and often form part of a cloud, the rest having the waviness of a fused mixture. Some few were observed inclosing inner bubbles, apparently a double cavity, but empty. In natural rubies the cavities are always angular or crystalline in outline, and are usually filled with some liquid, or if they form part of a "feather," as it is called by the jewellers, they are often arranged with the lines of growth. Hence the difference in appearance between the cavities in the natural gem and those in the fused gem is very great, and can readily be detected by the pocket lens. I have failed to find in any of the artificial stones even a trace of anything like a crystalline or angular cavity. Another

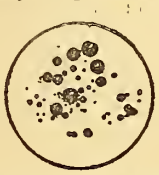


Fig. 1.—Spherical cavities in artificial ruby as seen at one time (enlarged 75 diameters).

Fig. 2.—Spherical and irregular cavities in artificial ruby as seen at one time, evidently from the lower part of the crucible (enlarged 25 diameters).

distinguishing characteristic is that in many genuine rubies we find a silky structure (called "silk" by the jewellers) which, if examined under the microscope, or under a $\frac{4}{10}$ to $\frac{8}{10}$ inch objective, we find to be a series of cuneiform or acicular crystals, often iridescent and arranged parallel with the hexagonal layers of the crystal. When in sufficient number these acicular and arrow-shaped crystals produce the asteria or star effect if the gem is cut in *en cabochon* form with the centre of the hexagonal prism on the top of the cabochon. I have failed to find any of them in the stones under consideration, or even any of the marking of the hexagonal crystal, which can often be seen when a gem is held in a good light and the light allowed to strike obliquely across the hexagonal prism. Dr. Isaac Lea has sug-

Fig. 3.—Liquid cavities in natural ruby and sapphire (enlarged 100 diameters).

gested* that these acicular crystals are rutile, and interesting facts and illustrations have been published by him. From my own observations on many specimens I believe there is little doubt of the truth of this hypothesis.† My explanation is that they were deposited from a solution, either heated or cold, while the corundum was crystallising, and I doubt very much whether they will ever be found in any substance formed by fusion.

The hardness of these stones I found to be about the same as that of the true ruby, 8.8, or a little less than 9, the only difference being that the artificial stones were a trifle more brittle. The testing point used was a Siamese green sapphire, and the scratch made by it was a little broader but no deeper than on a true ruby, as is usually the case with a brittle material. After several trials I faintly scratched it with a chrysoberyl, which will also slightly mark the true ruby.

* Proc. Philad. Acad. Sc., Feb. 16, 1869, and May, 1876.
† Paper on Star Garnets, N. W. Acad. Sc., May, 1886.

The specific gravity of these stones I found to be 3.93 and 3.95. The true ruby ranging from 3.98 to 4.01, it will be seen that the difference is very slight, and due doubtless to the presence of the included bubbles in the artificial stones, which would slightly decrease the density. As a test this is too delicate for jewellers' use; for if a true ruby were not entirely clean, or a few of the bubbles that sometimes settle on gems in taking specific gravities were allowed to remain undisturbed, it would have about the same specific gravity as one of these artificia tones.

I found, on examination by the dichroscope, that the ordinary image was cardinal red, and the extraordinary image a salmon red, as in the true ruby of the same colour. Under the polariscope what I believe to be annular rings were observed. With the spectroscope the red ruby line, somewhat similar to that in the true gem, is distinguishable, although perhaps a little nearer the dark end of the spectrum.

The colour of all the stones examined was good, but not one was as brilliant as a very fine ruby. The cabochons were all duller than fine, true stones, though better than poor ones. They did not differ much in colour, however, and were evidently made by one exact process or at one time. Their dull appearance is evidently due in part to the bubbles. The optical properties of these stones are such that they are evidently individual or parts of individual crystals, and not agglomerations of crystals or groups fused by heating.

In my opinion these artificial rubies were produced by a process similar to that described by Fremy and Feil (*Comptes Rendus*, 1877, p. 1029), by fusing an aluminate of lead in connection with silica in a siliceous crucible, the silica uniting with the lead to form a lead glass, and liberating the alumina, which crystallises out in the form of corundum in hexagonal plates, with a specific gravity of 4.0 to 4.1, and the hardness and colour of the natural ruby—the latter being produced by the addition of some chromium salt; by this method rubies were formed that, like the true gem, were decolourised temporarily by heating.

It is not probable that these stones were formed by Gaudin's method (*Comptes Rendus*, xix., p. 1342), by exposing amorphous alumina to the flame of the oxyhydrogen blowpipe and thus fusing it to a limpid fluid, which, when cooled, had the hardness of corundum, but only the specific gravity 3.45, much below that of these stones; nor is it at all likely that they were produced by fusing a large number of natural rubies or corundum of small size, because by this process the specific gravity is lowered to that of Gaudin's product. The same also holds good of quartz, beryl, &c.

The French syndicate referred the matter to M. Friedel, of the Ecole des Mines, Paris, supplying him with samples of the stones for examination. He reported the presence of the round and pear-shaped bubbles and determined the hardness and specific gravity to be about the same as in the true ruby. On

Fig. 4.—Acicular crystals in sapphire (enlarged 100 diameters).

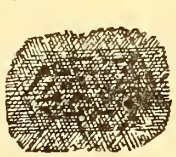


Fig. 5.—Cuneiform crystals in ruby and sapphire (enlarged 200 diameters).

analysis he found them to consist of alumina, with a trace of chromium for the colouring matter. The cleavage was not in all cases distinct, and the rough pieces given to him as examples of the gem in its native state had all been worked, so that nothing could be learned of their crystalline structure. When properly cut according to axes they showed the annular rings. The extinction by parallel light was not always perfect, which he believed to be due to the presence of the bubbles. He states that he himself has obtained small red globules with these inclusions by fusing alumina by oxyhydrogen flame; and although having no positive evidence, he believes these stones to be artifically obtained by fusion.

On the receipt of M. Friedel's report the syndicate decided that all cabochon or cut stones of this kind shall be sold as *artificial*, and not precious gems. Unless consignments are so marked the sales will be considered fraudulent and the misdemeanour punishable under the penal code. All sales effected thus far, amounting to some 600,000 or 800,000 frs., shall be cancelled and the money and stones returned to their respective owners.

The action taken by the syndicate has fully settled the position which this production will hold among gem dealers, and there is little reason to fear that the true ruby will ever lose the place it has occupied for so many centuries. These stones show the triumph of modern science in chemistry, it is true; and although some may be willing to have the easily attainable, there are others who will almost want—what the true ruby is becoming to-day—the unattainable. One will be nature's gem, and the other the gem made by man.

The* following recapitulation of the progress made from time to time by the different investigators in the artificial reproduction of ruby and sapphire may be of more than passing interest at this moment:—Gaudin (C. R., 1857, Vol. IV., p. 999, and 1857, Vol. XLIV., p. 716.—L'Inst., t. XXV., p. 110.—J. pr. Chem., LXX., p. 381—Bibl. univ. de Genève, t. XXXIV., p. 68. —Jahrb. f. Min., 1857, p. 444) was the first to reproduce corundum, which he did by heating before the oxyhydrogen blowpipe a closed crucible containing equal parts of alum and sulphate of potash and charcoal. It was fired for fifteen minutes and then slowly cooled. The mass was then lixiviated and attacked with diluted aqua regia, which left a sand formed of small corundum crystals, 1 mm. long and $\frac{1}{3}$ mm. thick. They were hexagonal plates having bases striated in three directions parallel to the sides. Some very fine included microliths resembling sillimanite were also observed in these crystals.

Elsner (J. pr. Chem., t. XVII., p. 175), operating in the same way, by fusing before the oxyhydrogen blowpipe anhydrous alumina with bichromate of potash, obtained red crystalline grains as hard as rubies.

De Sénarmont (C. R., 1851, t. XXXII., p. 762.—L'Inst., 1851, p. 165.—Ann. Chem. Pharm., t. LXXX., p. 214.—Pharm. Centr., 1851, p. 518) has applied the wet way to the crystallisation of alumina. He heated in a sealed tube, at 350° C., a solution of chloride of aluminum, or of nitrate of alumina, and produced rhombohedrons with truncated edges.

Almost at the same time Ebelmann obtained corundum (Ann. de Phys. et de Chim., 1851, t., XXXIII., p. 34) by a totally different process. He heated in a porcelain kiln a platinum crucible containing one part of amorphous alumina with three or four parts of borax. After a few days of heating all the borax was volatilised, and at the bottom of the crucible crystals of corundum were found, and on the edges long bluish needles of borate of alumina, which he separated by the action of chlorohydric acid. The corundum thus obtained was in hexagonal plates like specular iron of volcanic origin, and was quite similar to that obtained by Gaudin.

The base is striated by three systems of lines parallel to the sides. Numbers of very irregular vitreous inclusions were noticed in them, as well as microliths resembling sillimanite. The density of the crystals was 3·98, and, like the natural stone, they scratched topaz; they have, as in natural specimens, a ' p. = 122° 35'.

Carbonate of baryta added to the mixture facilitates the formation of the crystals and the development of rhombohedral faces, which thus attain a length of several mm. Carbonate of lime may be added or the borax wholly replaced by carbonate of soda, but hexagonal or dodecahedral plates will still be obtained. Ebelmann coloured his product by small quantities of metallic oxides. For example, violet was obtained by oxide of manganese (Oriental amethysts). It was noted that boracic acid alone could not replace the borax. Sainte-Claire Deville and Caron (C. R., 1858, t. LXVI., p. 764.—L'Inst., 1858, p. 133.—Ann. Chem. Pharm., t. CVIII., p. 55.—Dingl. pol. J., t. CXLVIII., p. 372.—J. pr. Chem., t. LXXIV., p. 157) obtained magnificent specimens of corundum by a different method. They placed anhydrous

* See "Encyclopedie Chimique," Tome II., Reproduction Artificielle des Mineraux, par M. L. Bourgeois.

fluoride of aluminum ($Al_2$ $E_6$) at the bottom of a charcoal crucible, and suspended in the centre of this a cupel of the same substance filled with boracic acid. The whole apparatus was allowed to remain at white heat for an hour; and on opening the crucible they found the interior lined with large thin hexagonal plates of corundum, presenting the combination $a^1$ p $e^2$. There were no striæ on the bases, but only hexagonal rosettes projecting, and brown arborescences. Vitreous inclusions of boracic acid with bubbles of gas were observed, often arranged in crowns, and fine microliths were also noticed, as already mentioned. They found that by adding a little fluoride of chromium to that of aluminum, and using a clay crucible with cupels of platinum, they could produce rubies together with a little sapphire. When they increased the quantity of fluoride of chromium they obtained green crystals (Oriental emeralds).

Debray (C. R., 1861, t. LII., p. 985.—L'Inst., 1861., p. 165.—Ann. Chem. Pharm., t. CXX., p. 184.—Jahrb. f. Min., 1861, p. 702.—Bull. Soc. Chim., 1865) describes several methods of obtaining corundum. He passed a slow current of chlorohydric acid over aluminate of soda at a red heat or over a mixture of phosphate of alumina and lime. In the latter case calcic wagnerite was also produced. M. Debray has also produced crystals of alumina by melting phosphate of alumina with three or four times its weight of sulphate of potash or soda, and thus producing an alkaline phosphate.

Quite recently H. Grandeau (C. R., 1882, t. XCV., p. 921) has had occasion to apply the preceding method to various oxides, and has found that, particularly with alumina, after several hours of heating, a crystallised double phosphate of alumina and potash is obtained at the same time as the corundum.

The mineral-producing qualities of fluohydric acid have been well employed by M. Hautefeuille in reference to alumina. It was only necessary to make the vapour of this acid (Ann. Chim. Phys., 1865, t. IV., p. 153.—Jahresb., 1814, p. 206) pass slowly over the amorphous alumina heated to a bright red heat in a platinum tube, previously diluting it with nitrogen and steam. On the hottest part of the tube foliated hexagonal plates of corundum will form, resembling very much specular iron of volcanic origin. The more the operation is prolonged the more beautiful these become, for the smaller crystals are destroyed to make way for larger ones.

M. Gaudin (C. R., 1869, t. LXIX., p. 1342), in 1869 gave a second method of producing corundum by exposing amorphous alumina to the flames of the oxyhydrogen blowpipe. This oxide melts into a very clear, fluid glass, which in cooling hardens into a chrystalline globule as hard as corundum.

MM. Fremy and Feil (C. R., 1877, t. LXXXV., p. 1029) have produced specimens of corundum remarkable for the size of the individual crystals and the weight of the crystalline masses, by means of a double decomposition in a dry way. They melted at a bright red heat in a large crucible of very siliceous material equal weights of alumina and minium, producing thereby a fusible aluminate of lead, which is soon destroyed by the silica of the crucible, giving place to a still more fusible silicate and liberating the alumina, which crystallises in the body of the liquid. Part of the lead is also volatilised or reduced by the gas of the furnace. Breaking the crucible, they found a superficial vitreous layer of silicate of lead, and underneath a mass of corundum crystals grouped in magnificent geodes. By the addition of a little bichromate of potash rubies were obtained, and sapphires by the further addition of a little oxide of cobalt. These are the most beautiful crystals of ruby and sapphire that have ever been obtained, but their hexagonal tabular form unfits them for cutting. They have the properties of corundum: D=4.0 to 4.1. The rubies, like natural stones, were temporarily decolourised by heating. MM. Fremy and Feil have also added fluoride of barium to the aluminate of lead in the preceding experiment. The two reagents were mixed in equal parts with the addition of a little bichromate of potash, and heated in a siliceous crucible surmounted by another reversible crucible. In the lower crucible they obtained a geode of ruby with vitreous inclusions, while the upper one was lined with long needles of a silicate of alumina and baryta. According to the analysis of L. M. Ferreil, this product is probably a barium anorthite.

MM. Fremy and Feil endeavoured to retard the reactions in this experiment so as to increase the size of the crystals. M. Stanislas Meunier (C. R., 1880, t. XC., p. 701), decomposed in a red-hot tube chloride of aluminum by the use of steam. In several experiments magnesium or zinc were also used as reagents. Corundum was thus produced in hexagonal plates or crystalline grains. MM. Fouqué and Michael Levy accidentally observed the formation of corundum in beautiful hexagonal plates while they were fusing microcline feldspar with fluorite. The corundum by sublimation lined the platinum cover of the crucible in which the experiment was made.

Last of all, M. F. Parmentier (C. R., 1882, t. XCIV., p. 1713), in a work relative to the action of molybdates upon oxides by dry process, has announced that the fusion of amorphous alumina with bimolybdate of potash will furnish corundum in plates like tridymite. It is important to keep the temperature of the crucible high, for if it is lowered an inverse reaction takes place.

[We take this opportunity of thanking Mr. Kunz for the above communication (which we believe was originally read by him before the New York Academy of Sciences), and for other favours.—Ed.]

## Gazette.

### Partnerships Dissolved.

Prescott & Bingham, Church Street, Camberwell, pawnbrokers. Hazlewood & Turner, Aston-juxta-Birmingham, manufacturing jewellers. Riddle & Co., Charterhouse Street, E.C., cutlers.

### The Bankruptcy Act, 1883.

#### Receiving Orders.

*To surrender in London.*—Frederick A. Grœbert (trading as Cameron & Co.), Wilton Road, jeweller.

*To surrender in the Country.*—Henry Smithers, Coventry, watch manufacturer. Robert Abbat and Tom Abbat, Leeds, metal dealers. Samuel Ruthstein, Cadoxton-juxta-Barry, pawnbroker. James Fletcher, Sheffield, silversmith. Francis Hall, Whitby, watchmaker. Samuel Southey, Manchester, jeweller. George Anderson Phillips, Cardiff, watchmaker. Mary Hannah La Trobe (trading as S. H. La Trobe), Bristol, watchmaker. George Cornell, Maidstone, watchmaker. Alfred Harcourt, Norwich, silversmith.

#### Public Examinations.

*In London.*—A. Elkan (trading as Alexander and The Mutual Trading Co.), Oxford Street and elsewhere, jeweller; March 2, at 1.

*In the Country.*—G. A. Phillips, Cardiff, watchmaker; March 9, at 10.30. G. Cornell, Maidstone, watchmaker; March 9, at 3. M. H. La Trobe, Bristol, watchmaker; March 9, at 12.

#### Adjudications.

*In London.*—W. Fitch, Mare Street, Hackney, watchmaker. F. A. Grœbert (trading as Cameron & Co.), Wilton Road, Victoria Station, jeweller.

*In the Country,*—H. Smithers, Coventry, watch manufacturer. S. Ruthstein, Cadoxton-juxta-Barry, pawnbroker. Clara Foord and Ellen Pickersgill (trading as J. B. Foord & Son), Hastings, jewellers. R. Abbat and T. Abbat, Leeds, metal brokers. G. A. Phillips, Llanelly, watchmaker.

#### Notices of Dividends.

*In London.*—Jane Bache, Wilmington Square, jeweller; 1s. 3d., first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street. E. H. Watts, Carnaby Street, Regent Street, goldsmith; 1s. 9d., first and final; 11, Milk Street Buildings, Cheapside, February 21.

*In the Country.*—C. Ankers, Southport, watchmaker; 1s. 8d., first; February 10, Official Receiver, Newcastle-under-Lyme. T. A. Tomlin, Sheffield, watchmaker; 2s. 8d., first and final; February 27, Official Receiver, Sheffield.

#### Scotch Sequestration.

R. Rankin (trading as Robert Rankin & Co.), Glasgow, wholesale jeweller.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

933. F. Bosshardt, a communication from L. Bouchet, France, for "Improvements in contact regulators for electric clocks." Dated January 21, 1888.

1,139. A. Dormitzer, London, for "Improvements in detachable safety watch pockets for ladies." Dated January 25, 1888.

1,162. E. C. Griffin, London, for "Improvements in machinery for pulverizing ores or other hard substances." Dated January 25, 1888.

1,278. H. Rowe, London, for "Improvements relating to devices for holding or securing watches or the like in bracelets and other articles." Dated January 27, 1888.

1,526. D. Cavé, London, for "An improved safety bow for watches and other similar articles." Dated February 1, 1888.

1,539. A. Guye, London, for "An improvement in keyless works for watches and other timekeepers." Dated February 2, 1888.

1,608. A. Hawkyard and R. M. Somers, London, for "Improvements relating to watch chains for insuring the safety of watches, sovereign purses and other appendages against theft." (Complete specification.) Dated February 3, 1888.

1,683. J. C. Mewburn, a communication from R. Lange, Germany, for "Improvements in watches, chronometers and other timekeepers." Dated February 4, 1888.

1,723. A. French and R. Munro, Glasgow, for "Improvements in separating or extracting gold, antimony or tin from ores, alloys, sulphides or oxidised compounds containing also lead, copper or iron." Dated February 6, 1888.

1,745. G. Hughes, a communication from A. Kaisir, Switzerland, for "Improvements in the mechanism of watches or other indicators, and for other similar purposes." Dated February 6, 1888.

1,914. J. Hornsby and G. E. Coupe, London, for "Improvements in apparatus suitable for separating gold from its ores." Dated February 8, 1888.

2,028. J. J. Lencham, Dublin, for "An improvement in gloves called the 'Watch glove,' or glove watch holder." Dated February 10, 1888.

2,325. J. Reynolds and A. Reynolds, Birmingham, for "A watch protector to protect the watch from being stolen." Dated February 16, 1888.

2,330. R. Westall, East Dulwich, London, for "An indicator to show whether a timepiece is wound up or not, and to prevent overwinding." Dated February 16, 1888.

## Recent American Patents.

| | | |
|---|---|---|
| Adjustable Cuff Retainer. | Robert L. Pratt ... ... ... | 376,547 |
| Adjustable Attachment for Opera and other Glasses. | Ivan Fox | 376,434 |
| Apparatus for Oxidising the Surface of Metals. | G. W. Gesner | 376,874 |
| Button. | Daniel A. Ladd ... ... ... ... ... ... | 376,890 |
| Cuff Button. | George R. Adams .. ... ... ... ... | 376,500 |
| Cuff Holder. | William J. Walters ... ... ... ... ... | 376,457 |
| Disc for Making Cluster Settings. | Christian Blanchard ... | 376,507 |
| Disc for Making Diamond Settings. | Christian Blanchard ... | 376,508 |
| Eyeglass Holder. | Calvin S. Ball ... ... ... ... ... | 376,847 |
| Mechanical Musical Instrument. | W. B. Tremaine ... ... | 376,725 |
| Process of Ornamenting Metal. | George Mathews ... ... | 376,605 |
| Watch Case Spring. | Carl G. Harstrom ... ... ... ... | 376,524 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. Truslove, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Correspondence.

*All Letters for Publication to be addressed to the* Editor *of* The Watchmaker, Jeweller and Silversmith, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Sir,—I have a small French drum time-piece, with club-tooth anchor escapement, which gains 1½ hour a week with the pendulum bob let down to the end of the rod.

I should be much obliged if you or some kind reader of the *Watchmaker* would tell me if there is any simple way of correcting this, other than that of putting a longer rod, as the rod is in one piece with the spring collet on the pallet arbor.

Yours &c.,
E. C.

[Try the escapement depth, and, if too shallow, this is doubtless the cause of the clock gaining. Sometimes these clocks have an eccentric bush for the lower pallet pivot, by turning which, the depth can be altered. If the escapement depth is found to be all right, the only way of correcting the clock is to lengthen pendulum, which can be done by either drawing or hammering the rod.—Ed.]

Sir,—I beg to inform you, for the information of Chronometer Makers, that the annual trial of chronometers at the Royal Observatory, Greenwich, will commence this year on July 7, and will be for a period of 29 weeks. The chronometers will be tested in the oven for two periods of four weeks each, at temperatures ranging from 80° to 100° F., and also at the ordinary summer and winter temperatures of the room.

Application for permission to send chronometers for trial, is to be made to the Hydrographer, Admiralty, S.W., not later than Monday, June 18; and no chronometer can be received at the Royal Observatory later than Monday, July 2.

I am, Sir,
Your obedient servant,
W. H. M. Christie,
*Astronomer Royal.*

Royal Observatory, Greenwich,
London, S.E.
*February* 7, 1888.

## Buyers' Guide.

The

# Watchmaker, Jeweller and Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

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CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

**Subscription.**—A copy of the Journal will be sent monthly for one year, post free, to any address in the United Kingdom or countries in the Postal Union for 5s. payable in advance.

**Advertisements.**—The rates for advertising will be sent on application. THE WATCHMAKER, JEWELLER AND SILVERSMITH will be found an exceptional medium for advertising. Special Notices, Situations, &c., per insertion, 1s. for two lines, prepaid.

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THE WATCHMAKER, JEWELLER & SILVERSMITH,
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LONDON, E.C.

*Cheques and Postal Orders to be crossed and made payable to* J. TRUSLOVE.

AGENT FOR THE AUSTRALIAN COLONIES:
EVAN JONES,
Hunter Street and Royal Arcade, Sydney, N.S.W.

## Editorial.

FOREMOST among the sciences which (in connexion with the concatenation of jubilees that have been celebrated) we have for the past twelve months been accustomed to hear alluded to as having been discovered or developed within either the last 25 or 50 years (the period varies as the celebration is "silver" or "golden") is photography.

But the development of this science in regard to its application to the arts is by no means completed; indeed, considering the variety of its possibilities in this respect, the comparatively few useful purposes to which it is put in the manufactures is disappointing. In a short period following the time when Daguerre, in 1839, demonstrated the practicability of obtaining pictures by means of the action of light on a chemically-prepared ground—which was called, indifferently, Daguerreotype or Photogenic Drawing—many great advances were made on his processes. But it would seem that discoveries of this kind follow a sort of climacterical law, for, after the first great improvements in photography proper, it has been for many years followed up in one direction only. Thus, although it has long been recognised what a valuable auxiliary to watchmakers and jewellers a means of producing permanent photographs on enamel would be, and many attempts have been made in this direction, none of them have proved more than partially successful, while endeavours to obtain photographs on various metals have hitherto failed altogether. Such being the case, the news that a new process for producing photographs on the metals with which jewellers have to work has been invented or discovered by an American photographer will be heard with satisfaction. At present the process is a secret, but the inventor states that the vital part of it consists in the development of the negatives by means of a certain liquid, the nature of which is not disclosed.

At an exhibition of the results obtained by the new method, recently held in New York, pictures were shown on buttons, watch cases, brooches, lockets, and other articles of jewellery;

and the work exhibited is said to be very pretty and very delicate.

Should further developments demonstrate its practicability from a commercial point of view and the permanency of the photographs obtained, the invention may confidently be predicted to produce a big "boom" in the fancy trades, as it is just the thing to take the fancy of a large section of the public. With our present knowledge of the subject, speculation is, of course, idle; but if the process become the subject of a patent, we may expect to be shortly enlightened with regard to it. Meanwhile, jewellers on this side will anxiously await further information.

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The opening of the La Porte, Indiana, School for Watchmakers, on March 1 last, will mark an epoch in the American watchmaking industry, and may, if read aright, be of some use to our home manufacturers, as showing the straits to which an industry may be reduced by persistently following any one extreme course. It has long been felt and acknowledged by the thoughtful part of the community on the other side, that their system of machine production and division of labour is non-conducive to the well-being of the trade individually and (less directly perhaps) collectively. In fact it is now admitted that the automatic system does not create watchmakers, and (statements to the contrary, for advertising purposes, notwithstanding) a certain portion of skilled manual work is necessary even in the best regulated factories. Nearly all the skilled workmen employed in the United States watch trade are drawn from European sources (England and Switzerland being the principal), but the Americans, having apparently awakened to the necessities of their case, we may expect this to be altered in the near future by the establishment of schools, such as that of La Porte, throughout the country.

The English watch trade, on the other hand, has suffered from a too persistent adherence to antiquated methods of production and a reliance on individual efforts. This system, while at few-and-far-between times producing geniuses, has no earthly chance against large commercial combinations in the manufacture of cheap work; but there is no reason why the two systems should not be combined so as to work well; and the experience of the Americans is a lesson which should not be lost sight of by those who, recognising the state of transition in which our trade is at the present time, are contemplating new departures.

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# General Notes.

THE shop of Mr. J. Welby, jeweller, of 13, Bond Street, Brighton, was burned out on February 29, and stock, &c., estimated of the value of £2,000, destroyed.

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Twenty-four O'clock.—After a six months' trial, the Canadian Pacific Railway (in view of the advantages that are stated to have resulted from its adoption both to employés and travellers during that time) has decided to definitively adopt the twenty-four hour system over all its lines.

It is proposed to erect a time-ball, which shall indicate noon to Paris and its environs, on the summit of the Eiffel tower, now nearly completed.

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Mr. John R. Whitley, Director-General of the Italian Exhibition to be opened in London next May, was last month advised that a selection of works of art and various trophies will be contributed to the Fine Art and Loan Section of the Exhibition by the Italian Government.

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Paris Exhibition.—Watchmaking will be represented in the Swiss Central Commission by the National Councillors, Comptesse (Neuchâtel), Dufour (Geneva), and Franeillon (St. Imier). The Federal Council have appointed Dr. Duplan, attaché of the Swiss Legation in Paris, as assistant and deputy of the Swiss Commissary General.

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Three London gentlemen have, it is stated, just completed an examination in West Cork for a gold mine, which is supposed to exist near Dunmanns Bay. The lode is said to be 6ft. in breadth, and to run to a length of over a mile. Samples of the mineral have been taken away for the purpose of being assayed, and the result of the inspection is stated to be encouraging.

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Time Signal on South Castle, Southampton.—We learn from the Hydrographer that the Harbour Authorities of Southampton have given notice, dated January 31, 1888, that a time signal has been established on South Castle, Platform, Southampton. The signal is a ball, dropped by electricity from Greenwich; and is made once daily, with the exception of Sundays and Bank holidays, as follows:—The ball is hoisted as preparatory, about five minutes before signal, and dropped at $1^{h.}\ 0^{m.}\ 0^{s.}$ Greenwich mean-time. Position, South Castle, lat. 50° 53′ 39″ N., long. 1° 24′ 5″ W.

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The first school for the practical teaching of watchmaking in America was opened in La Porte, Indiana, on March 1st. The School, which is modelled closely after the Paris École d'Horlogerie, is under the direction of Mr. J. R. Parsons, who is well-known in American horological circles; the number of students at the opening of the School was forty, but this number is expected to be soon largely increased. The rooms are described as being large, light and airy, and are stated to be well adapted to the purpose to which they are to be applied; they are fitted up with lathes and work-benches, and all the accessories necessary to the work.

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*L'Horlogerie Astronomique et Civile.*—Its usages, its progress and its teaching at Paris—is the title of a new addition to the literature of watchmaking. Its author is Mons. A. H. Rodanet, President of the Paris Syndical Chamber of Horology, whose name is so well-known in connection with the modern French revival. Though largely dealing, as the title denotes, with sidereal and solar differences of time, and the details of mechanism necessary to secure their representation in timekeepers of various kinds, the book is chiefly of interest from the manner in which the theory of isochronism is dealt with by the author, and the numerous compensation experiments enumerated and described.

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The Ruby Fields in South Australia.—The constable in charge of the district in which the ruby fields are situated, near Alice Springs, has reported that there are now upwards of 860 men gathering rubies, while the remainder are either prospecting for gold or working claims at Paddy's Hole. Those gathering stones are scattered over a large tract of country, while the gold-seekers are within a mile or two of Paddy's Hole. Some of the latter are said to be getting good returns. Several good reefs have been found, one of which is estimated to give over 3 ozs. to the ton. Mr. Richard Pearson reports that the stones of the M'Donnell Range Ruby Co. are being sold as Australian rubies. He has put 600 in hand to be cut, and the smaller ones are to be sent to the continent. Several colonists have given orders for jewellery to be prepared with South Australian rubies.

On the 4th ult. the house, No. 8, Frankfort Lane, Plymouth, in the occupation of Mr. J. A. Medlen, manufacturing jeweller, was destroyed by fire. The premises were completely gutted and some valuable lathes, fittings, &c., destroyed. Comparatively little jewellery, however, was lost, it being Mr. Medlen's practice to take home the more valuable portion of the stock every night.

About midnight, two months ago, the window of a Southport (Mr. J. Wooller) jeweller's shop was broken by a brick being thrown into it, and about £400 worth of watches, rings, &c., were stolen. As no clue could be obtained, the matter had been given up as hopeless, until one day last month, when a police-constable named Allen pawned a gold watch, which was recognised as one of those stolen. Allen, a married man, was arrested, and was found to have in his possession some more of the property. A cook was a prominent figure in the case, and Allen made her a present of a gold watch and a ruby ring. He sold several articles to residents, but it is believed the greater portion of the property has been sent out of town. On the night of the robbery he was "on duty" in the street where the offence was committed.

The syndicate formed to promote the sale, and to monopolise, if possible, Australian Rubies, is according to the *European Mail*, composed of Messrs. Hasluck, Messrs. Dupont & Bassompiere, Mr. Tom Wood, a well-known Cape speculator, Mr. H. V. Adams, who has a large West End connection, Mr. W. P. Bloomfield, a diamond and share broker, with several others. In addition to the syndicate being formed to promote the sale, the members of it have bought between them about 15,000 £1 mining shares. As there have been no good or big commercial sales made, and as there has been opposition by the trade generally, the syndicate possess the courage of their convictions in a marked degree to embark in such a risky enterprise. They profess to give their faith on the future of the stone, asserting that its colour and ruby hardness will some day before long bring it favour and considerable financial value. The company is formed solely to promote the sale of stones from the Macdonnell Ruby Ranges Mining Company, in Central Australia. A large number of cut stones have been sent to the Colonies, and over here it is stated that £200 or £300 worth have been sold with other jewels—mostly private manipulations.

Mr. George Hayes, retail jeweller, of 121, Hackney Road, was robbed of five silver and four metal watches by burglars on Sunday, February 19. On the following Tuesday a lad called and asked him to repair a metal watch, which he at once recognised as one of those which had been stolen. He questioned the lad, and he said that he had purchased it from Alfred King, for 1s. 6d. The police were communicated with, and Alfred King was arrested. He then said he had bought the watch from Alfred Sherwin, and the latter when questioned, said that he had bought it from a man whom he did not know. On Sherwin's premises being searched, the police discovered a bunch of skeleton keys, a bottle of aquafortis, a number of pawntickets, and a file. King and Sherwin were arrested and brought up at Worship-street to-day. Mr. Hannay remarked that the evidence connecting them with the burglary was so very slight that he could not send them for trial upon it. The finding of the skeleton keys and the other articles was, however, an element of great suspicion. The prisoners would be discharged, but the keys would remain in the possession of the police.

The Colonies and the Merchandise Marks Act.—In the House of Lords on the 15th ult. Lord Herschell called attention to the working of the Merchandise Marks Act, and asked what steps had been taken, or were being taken, to render the Act effective in India, the Colonies, and foreign countries. He pointed out that no law had been passed in India to enable falsely-marked goods to be stopped at the ports; consequently, when such goods arrived in this country for transhipment they were stopped. The result would be that the goods would be sent by other routes, and, as the same evil existed in regard to the Colonies and foreign countries, some agreement should be come to with other Governments on the subject. Lord Cross, as representing India, said he had sent three dispatches on the subject to the Indian Government since June last, but had not received a reply. Lord Knutsford, as representing the Colonies stated that the Colony of St. Helena had passed an Act, that in five other Colonies Bills had been introduced, and that in nine others legislation had been promised. From nineteen Colonies, including Canada, New South Wales, and South Australia, no reply had been received. Lord Salisbury, speaking with reference to foreign countries, said the Government would consider any practical suggestion which might be made to it.

At a meeting of the Birmingham School Board last month, the Chairman (Mr. George Dixon, M.P.) reported that, in accordance with an instruction of the Educational Committee, a deputation representing the London and Birmingham School Boards, and fourteen other Boards, waited last week upon the President of the Council of Education in London, and urged upon the Department the desirability of the Government re-introducing their Technical Instruction Bill. The Board discussed the report of the Appeals Committee, submitting a scheme for dealing with applications for the payment of non-pauper school fees, and a resolution was carried authorising that the necessary arrangements be made with the Birmingham Board of Guardians for carrying the Scheme into effect. Dr. Crosskey moved a resolution approving of a resolution passed at a recent meeting of the Birmingham Trades Council, giving the opinion that technical education, to be of real and practical service to the bonâ-fide working man, should be entered upon earlier in the school life of the children, and should form part of the ordinary school work.

The will of Mr. Simpson Ashbridge, late of 568, Mile-end Road, 1, Waterloo Terrace, Commercial Road, East, and 49 and 51, Mile-end Road, Pawnbroker and Silversmith, who died on January 13th last, was recently proved by Mr. Samuel Prentice Ashbridge, Mr. John Ashbridge, and Mr. Samuel Prentice, the executors, the value of the personal estate amounting to upwards of £30,000. The testator bequeaths £500, an annuity of £800, and all his furniture and household effects to his wife, Mrs. Susannah Ashbridge; £500 each to his children, John, Arthur, Catherine, Susannah, and Mary Ann; £500 a year each to his sons, Samuel Prentice and Alfred Telfer, during the life of his wife, and an annuity of £72 to his sister, Mrs. Sarah Smith. On the death of his wife he gives his shop and business, 568, Mile-end Road, to his son John; 1, Waterloo Terrace, to his son Samuel Prentice; and 49 and 51, Mile-end Road, to his son Alfred Telfer; and there are specific gifts of numerous freehold, leasehold, and copyhold house property in the East end of London, to his other children. The residue of his real and personal estate he leaves between his children (with the exception of Samuel Prentice and Alfred Telfer).

The Diamond Market.—The *Amsterdam* market has been abnormally dull throughout the month, and were it not for the few foreign buyers, trade would be at a standstill. Nevertheless, the factories are all reported to be fully occupied. *Rough* has remained stationary throughout the month. The state of the market may be summarised in: Supply good, demand small. A slight improvement is manifest in the *Paris* market, for, as *De Diamant* says, the goods on offer are looked at now, whereas even this was refused a short time since.

The *London* market has been dull during the past month, as, although the steamers "Hawarden Castle," "Prætoria," "Mexican," "Trojan" and "Grantully Castle" arrived from the fields, bringing full parcels (the last-named bringing, besides her own freight, the mails of the disabled "Norham Castle"), the weather has greatly interfered with trade; the number of foreign buyers has been insignificant, and but small transactions have been effected.

Latest from *Kimberley* report trade dull, prices somewhat lower in response to the home demand, and no early improvement expected.

## Trade Notes.

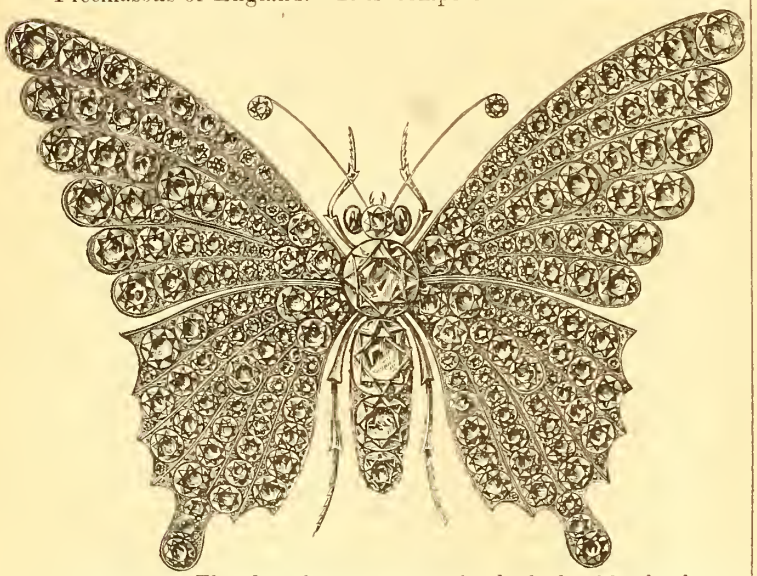
THE firm of Joseph Rodgers & Sons, Limited, Sheffield, cutlery manufacturers, have declared a dividend of 12 per cent. on the past year. This is the third consecutive year the Company has paid the same dividend.

Commemorative Silver Wedding Medal.—Mr. J. W. Palmer, of 281, Strand, has forwarded a neatly executed medal, struck by him in commemoration of the Silver Wedding of their Royal Highnesses the Prince and Princess of Wales. We understand that the medal has been accepted by their Royal Highnesses, and that it is intended to distribute 1,000 of them among the school children in London.

The Kew watch trials seem, from all appearances, to be steadily growing in popularity, while the official publications of the rates made from time to time show a marked advance in the time-keeping qualities of the watches submitted for trial. Last month Messrs. Usher & Cole, of 105, St. John Street Road, succeeded in beating the record for centre-seconds watches with a going-barrel keyless watch which gained an "Especially Good" "A" certificate with the large number of 85·5 marks.

Under Patent No. 14,124, Messrs. Kendal & Dent, of 106, Cheapside, have introduced a new gauge for the use of the retail trade for measuring the size of the finger for rings. It consists of a narrow strip, or strap, of metal having a series of perforations into one of which a projecting tag goes when the band is brought into position around the finger. The perforations are lettered from A to N (the ordinary ring gauge characters). The band has the merits of simplicity and cheapness, and seems well adapted to the use for which it is intended.

Among the numerous souvenirs presented to the Prince and Princess of Wales, on the anniversary of their Silver Wedding last month—the greater number of which are strikingly evident of the fertility of resource and excellence of execution of our modern jewellers, and of the progress that has been made of late years in the designer's art—none were of more artistic or intrinsic merit than the "Diamond Butterfly," presented to Her Royal Highness the Princess of Wales, by the Grand Lodge of Freemasons of England. It is composed of the finest Brazilian



Diamonds. The three largest are set in the body, 29 other large stones on the outside edge of the wings, and 185 other stones, tapered in lines to the body, form the wings, which are balanced on Gold Springs. The eyes are of Rubies, and are the only colour in an ornament that reflects great credit on the Committee of Selection and the firm of Messrs. Johnson, Walker & Tolhurst, of 80, Aldersgate Street, who designed and manufactured the same.

The white alloy registered under the name "Albo Silver" which we called attention to in our notice of the last Birmingham Exhibition is, we learn, in great demand throughout the trade, so much so, that a further mention of it will not be out of place. It is peculiarly suitable for the manufacture of cheap jewellery, as it has the whiteness of grain silver, without a tinge of the yellow or leady colour generally characteristic of alloys of this kind. Indeed, so highly was it reported on by the authorities of Mason College in this respect, that, at their request, samples in ingot, and in a manufactured state were permanently deposited in the museum of that institution. The chains manufactured of this material are especially good and are made up in a very saleable manner, either loose or on a very pretty registered pad; they are on sale by all wholesale houses.

Since the Merchandise Marks Act has been on the carpet, one of the common objections to its stringent clauses as regards watches, has been that we could not manufacture the mainspring, but were dependent on the foreigner for this essential; and, unfortunately, the generally received impression among the trade on the subject has found vent in the discussions on the Bill, until it is not too much to suppose, that many of the public are at the present under the same impression. Such a confession of weakness was not only quite unnecessary and impolitic but has no foundation in fact—one or more makers of English mainsprings having always existed in London. There is no doubt that for the last twenty years more springs have been imported than have been manufactured in the country. But that does not alter the above fact; it has been entirely a question of competition in price, and the former have never been used for the highest-class work. Now that the Act is in force, there are signs of increased activity in this branch of the trade: the Clerkenwell spring-makers are adding to their staff of workmen, and reports received show that the stimulus is extending to provincial centres. We have just received a sample spring from Coventry, which for form, finish and temper, would compare very favourably with anything the Swiss can produce. It is made expressly for going-barrel watches and has the last coil bent the reverse way, in order to prevent coil friction. The maker is Mr. W. Terry, of Spon Street, who informs us that he has supplied the local trade with similar springs for the last nine years.

Mayoral Chain for West Hartlepool.—Mr. William Gray, the well-known ship-builder, and first Mayor of Hartlepool, has presented to the town an elaborate gold chain of office. The commission, given to Mr. A. Harris, in West Hartlepool, was executed by Messrs. T. & J. Bragg, of Birmingham, who have carried it out in their well-known style. The Arms and Crest of the Borough, with the suggestive motto, "E mare ex industria," as upon the Town Seal, are held within a gothic quatrefoil, with rich tracery and finials. Royal and Imperial crowns, with the initials "V. R.," occupy respectively the angles of the quatrefoil and fix the year of the incorporation of the Borough as that of the Royal Jubilee. The whole is encircled by an enamelled band setting forth in gold letters the fact of the presentation. A large gold anchor of modern form appears above and below the Badge, the upper ring attaching it to the centre link of chain. A fac-simile in miniature of the magnificent silver Mace, just made for the town, crosses the badge from right to left, while the Trident of Britannia crosses at the opposing angle. The centre link bears a miniature portrait in enamel upon gold of Her Majesty the Queen, surmounted by the Crown of the United Kingdom, round the painting being an enamelled garter, with a legend referring to the Jubilee. The links of the Chain are well arranged, larger links with shields and ribands for names and crests of successive Mayors, being alternated with letters "W. H." combined together by means of Britannia's trident, which thus forms an interesting feature, throughout the length of the Chain. The gold is of 18 carat quality throughout, every link being Hall-marked, and the weight is fully 36 ounces. But the style and character of the work, far more than the intrinsic value of the material, will give it a high place among the civic decorations of the kingdom.

# Birmingham News.

From Our Correspondent.

A VERY inactive state of trade is just now prevailing among manufacturers in the Birmingham jewellery trade. A walk round the jewellers' quarter, taking Vyse Street, Spencer Street, Northampton Street, and onwards along Warstone Lane, the very centre of the jewellers' sphere, will reveal to a very ordinary observer the fact that nothing of a very stirring nature is going on; the general remark being that the neighbourhood looks more like Sunday than working days, while the number of "premises to let" daily increases, occasionally enlivened by a few posters announcing that "Messrs. So-and-so" are selling the shop fittings, stock-in-trade, &c., &c., previous to renouncing the business altogether. The effect of this is that numbers of workmen are from time to time turned out, whose only hope is to join the unemployed or emigrate—a good many adopt the latter course.

* * *

Then again, the outworkers, such as setters, gilders, engravers, &c., lose a customer; and so the ball keeps rolling, and like the proverbial stone that gathers no moss, the number in the trade is gradually diminishing year by year. Well, "when things get to the worst they must mend," but most of us are wondering of what the worst will consist?

* * *

Some of the coloured gold workers report a fair amount of business, and some gem ring makers are still making a decent turnover in the year, but at small profits and considerable risks, owing to the continued long credit system.

* * *

Some of the makers of silver jewellery tell me that they cannot *give* it away; and one of the factor's travellers told me that the shopkeepers will no longer stock any of it; this looks as though a probable change of fashion is coming, and I think that it is most needful, as there is, or has been, a perfect glut of silver stuff of a character not worthy of the name of jewellery—most of it is now being made by girls and youths at low wages; it is cheap and proportionately nasty.

* * *

Mr. I. Izon, manufacturing jeweller, Spencer Street, is relinquishing his business and selling all tools, shop fittings, &c., by auction; after being in business some fifteen years, he declares himself disgusted at the state of affairs, makes his bow and retires.

* * *

I hear constant enquiries from employers (jewellers) for workmen who are capable of using a turning lathe; now this is a branch of mechanics that the average working jeweller is totally ignorant of; until very recently an apprentice in a jeweller's workshop did not have a turning lathe in the place to learn anything about, but with increasing competition every method that simplifies or increases the output is eagerly sought after; consequently the "master jeweller" is *at last* turning his attention to lathe work, for gnurling, burnishing, turning and spinning small work. As this class of work can be done by means of a good lathe with a few chucks and holders for drills, &c., so much more easily, more accurately, quicker and altogether better than the old hand processes, I wonder that they have not adopted it sooner; the consequence is they find that workmen have to be educated to a new branch of their trade, which they should have learned when boys. I strongly recommend all apprentices of the present day to get a good insight into the use of the turning lathe, as I am convinced that the workman of the future will not be considered efficient unless he has a thorough knowledge of small turning, spinning, &c. If the shop he works in does not contain one, let him save up his spare cash and buy one, the same as he would a bicycle. He will find the money return hereafter. There is a very good one obtainable in the neighbourhood for £5 5s.—a specially made thing for the purpose, with a variety of little parts and of beautiful workmanship.

There is a brisk trade being done in mounting Jubilee coins as brooches, with or without borders, reversible and otherwise, some enamelled in glowing colours, and others left in their own simple beauty—if they possess any. Opinion seems to be divided on this point; some of the die-sinkers at the start of the year made numbers of dies in imitation of the coins, with the enamelled parts ready cut away, but they did not take, the genuine coin being preferred.

## The Irish Exhibition in London.

PERHAPS no exhibition of recent years is likely to give results, more practically useful, than the one which is to be opened early in the coming summer at Olympia, Kensington. Ireland possesses great natural resources and important industries, and a comprehensive display of what she can produce or manufacture will not only be an object lesson of the greatest interest to the people of Great Britain, but will do much to assist the revival of trade in Ireland. The Exhibition is begun under the happiest auspices. It knows neither politics, religion, nor class, but has for its Executive Council and Patrons the most distinguished representative men. Perhaps for no other purpose could nearly 700 names, representing every phase of political, religious and social life, be brought together in active union. The Executive Council are the Duke of Abercorn, the Duke of Westminster, K.G., Lord Charles Beresford, M.P., Sir R. N. Fowler, Bart., M.P., Mr. Herbert Gladstone, M.P., Mr. Ernest Hart, Lord Arthur Hill, M.P., the Earl of Lathom, P.C., Sir John Lubbock, Bart., M.P., Mr. Justin McCarthy, M.P., the Marquis of Ormonde, Mr. J. H. Raffety, Sir. C. A. Russell, Q.C., M.P., and Lord Arthur Hill is the Honorary Secretary. The trustees are Mr. Alfred de Rothschild, Mr. Ruthven Pym, Mr. Wilfrid A. Bevan and Mr. H. F. Slattery. Prominent among the Patrons are the Archbishop of Canterbury, the Archbishop of Dublin, and Cardinal Manning, Archbishop of Westminster; the Marquis of Hartington, Mr. C. S. Parnell, M.P., the Lord Mayor, Sir John Whittaker Ellis, Bart., M.P.; the Duke of Argyll, the Duke of Leinster, Lord Randolph Churchill, M.P., Rt. Hon. Peter O'Brien (Solicitor-General for Ireland), Sir William Ewart, Bart., M.P., Rt. Hon. Arthur Kavanagh, Mr. Labouchere, M.P., the Rt. Hon. Sir W. Hart Dyke, Bart., M.P., Sir James Spaight, Sir Patrick Keenan (President Committee National Education, Ireland), Sir John B. Greene, C.B. (Royal Agricultural Society, Ireland). With a view of giving the humble Irish artisan the same opportunity for exhibiting the product of his skill as the large manufacturer, the Council have wisely determined to make no charge for the space occupied in the Exhibition, except in special cases. The Exhibition will be opened on the 4th of June, and remain open until the end of October, and the whole of the vast space at Olympia will be utilised. Among the special features will be a representation of an Irish Village, with the veritable peasants at work upon their cottage industries, and the exhibits will include metal working, watch making, mining, electro-plating and machinery. The Exhibition is to remain open from June 4th to October 27th.

## The Writing Telegraph.

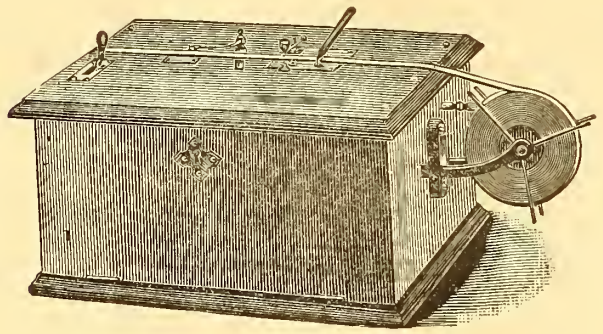
THE telegraph, as a factor in the commercial and social life of this country, is about fifty years old. The telephone, which for the first time introduced the paraphernalia of telegraphy into our own households, is, as an actual working practicable invention, not more than ten years old. How largely the telephone has served us directly and indirectly it would be difficult to say. Just as the electric light has improved gas-lighting, so, without doubt, has telephony improved other forms of telegraphy.

The telephone has done much, and it has many virtues, but close acquaintance with it reveals some very glaring defects. It

has the demerit of being a babbler of secrets, and it is also an eavesdropper. There are many who assert that these vices are ineradicable, and they are prepared to discard the old servant if they can find a new one with more virtues and fewer faults Discretion they claim to be a very essential virtue in a message-bearer, and this is what the telephone eminently lacks.

The good points of the telephone may be summed up thus : it can be used by any who can speak and hear.

The new claimant for the telephone's situation—or rather, for a situation beside it—is the writing telegraph. There need be



no rivalry between the two ; each has its sphere, and they may work harmoniously.

We have said that the telephone may be used by all who can speak and hear : the writing telegraph may be used by all who can write and read. For social purposes the telephone has its uses ; for business purposes the writing telegraph has enormous advantages over its sister invention. It will be at once obvious—the contention need not be laboured—that to a business man a written communication is of more value than a verbal one. This the writing telegraph gives. A man may, in London, sit at his desk and write a holograph letter to his correspondent in Liverpool ; that letter is being received there as fast as it is written, a duplicate is retained by the sender for subsequent reference, and the answer comes back in the handwriting of the Liverpool correspondent or his deputy.

A point wherein the writing telegraph has advantage over the telephone may be mentioned here. All know how often it happens that the person one wishes to speak to through the telephone is "out" or "engaged ;" every one has wished that he could "leave a message." This the writing telegraph can and does do. In fact, the operation is precisely that of sending a letter in the sender's own handwriting at lightning speed, and receiving a reply at the same rate.

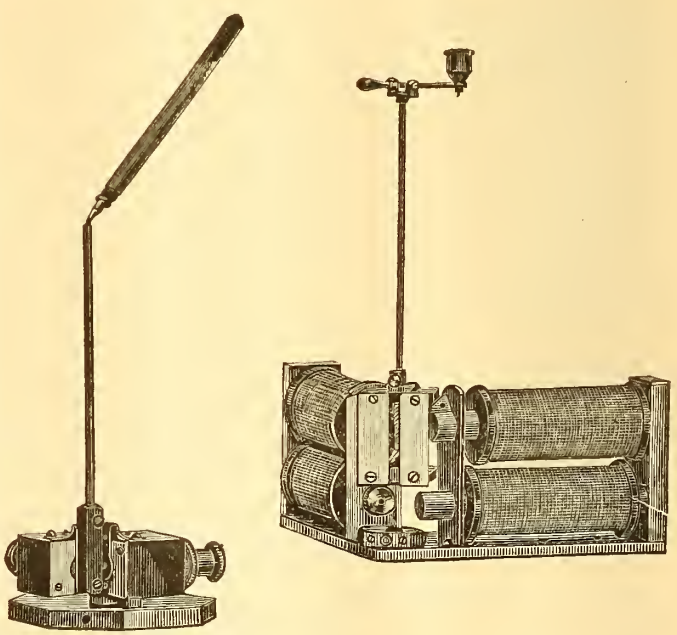
We have said that there need be no rivalry, and that the two inventions may work harmoniously. This should be the case for three reasons : First, because the two inventions are blood relations—the writing telegraph may almost be said to be the combination of the parts of two telephones. Second, because their functions supplement each other. There is no more reason why, on the one hand, we should cease to talk and make all our communications in writing, than there is, on the other hand, that we should only talk and never write. Third, because the two things, writing and talking, can go on simultaneously, and on the same electrical circuit.

The *modus operandi* is easy to follow. Since the days that the telephone first came amongst us, we have become familiar with the fact that a distant tympanum may be made accurately to follow the motions of a transmitting tympanum. The transmitting tympanum, as it is moved, more or less presses two pieces of carbon together. With varying degrees of pressure, varying resistances are put in the line circuit, and these varying resistances determine the amount of current flowing through the line. The writing telegraph employs the same principles, but the parts are evolved for their different functions. Further, in the writing telegraph, motions in at least two dimensions of space are necessary, so that it is necessary to employ what may be considered as two transmitting telephones and two receiving telephones. A pen, or stylus, at the transmitting station, is made, by its movements—as in shaping the letters of which writing is composed—to press upon two series of carbon discs, arranged at right angles to each other. The movements of the pen are, as it were, constantly analysed into their "up and down" and "right and left" constituents, and values of these in quantities of electrical current are transmitted along the line to two electro-magnets, placed in relations to one another, similar to those occupied by the series of discs. The electro-magnets have an armature, common to both, mounted on an antagonistic spring, and this armature is pulled upon by the two magnets exactly as the tympanum or armature of a receiving telephone is pulled according as the electro-magnets are more or less energised. At the transmitting station then, we may consider the operation to be that of analysis of the curve into values of its "up and down" and "right and left" constituents and the transmission of these values to the receiving electro-magnets. At the receiving station the operation may be regarded as the translation of these values into motions of the armature and the synthesis of these motions. The receiving pen then, carried by the armature, must move as does the transmitting one, and this as will have been seen is accomplished by a daring application of well known mathematical and electrical principles.

In many manufactures, founded for purposes of obtaining a specific result, secondary results follow. In gas-making, gas is the product sought, but there are what are called bye-products as well ; these bye-products have often been so skilfully worked up that they become more valuable than what may be called the primary product.

Something even better than this is the case with the writing telegraph : it came already prepared by its very nature to solve the problem of simultaneously telephoning and telegraphing. The writing telegraph is the invention of Mr. James Hart Robertson, an American Scotchman.

The invention is in growing use in America, and much more will before long be heard of it in England. At present it is to be seen in operation at the offices of Mr. John Morgan Richards,



46, Holborn Viaduct, London. The illustrations show an example of the writing ; the general appearance of the instrument ; the transmitting portion of the apparatus detached ; and the receiving portion also detached.

## Presentation to Mr. John Jones.

ON Tuesday, the 13th ult., a deputation waited on Mr. Jones, at his residence, The Manor House, Send Green, Surrey (to which he has removed on his retiring from business), for the purpose of presenting him with a Silver Claret Ewer, subscribed for by fifteen gentlemen who have been, or are now, Members of the Council of the Horological Institute. The Ewer was a very massive and beautiful piece of workmanship, made by Mr. William Evans, of Seckford Street, Clerkenwell, engraved with Mr. Jones' crest and motto, and the following inscription :—

PRESENTED TO JOHN JONES, ESQ.,
BY A FEW OF THE PAST AND PRESENT MEMBERS OF THE COUNCIL OF THE HOROLOGICAL INSTITUTE, AS A TOKEN OF THEIR APPRECIATION OF HIS MANY SERVICES AS VICE-PRESIDENT, DURING A PERIOD OF 25 YEARS, AND AS A MARK OF THE RESPECT AND ESTEEM IN WHICH THEY HOLD HIM.

The deputation consisted of the following gentlemen :— H. Bickley, R. Strachan, C. Bacon, S. Jackson and D. Glasgow. Mr. Glasgow, who presented the testimonial on behalf of the subscribers, said he had never been called upon in the course of his life, to do anything that gave him so much pleasure, and at the same time so much difficulty in expressing it ; but he could assure Mr. Jones, on behalf of the subscribers, that the feeling of affectionate friendship felt by them, was not to be measured by the intrinsic value of the gift, as they each and all felt it a great privilege not only to be able to express their appreciation of his past services, but also their sincere wishes for his long life and happiness.

Mr. Jones in reply said, he had never before received anything that gave him so much pleasure ; it was a mark of the appreciation of his services and goodwill towards himself by the men he most honoured, and who knew him best ; it touched him very much and he sincerely thanked them for their spontaneous and unexpected gift. As a work of art, bearing so honourable a legend, it would be always held precious by him, and he trusted it would pass on to those who would cherish it for his sake, as a memento of some passage of his life, his coadjutors had thought worthy of this significant mark of their approbation.

## Frauds in Rare Gems.

By GEORGE F. KUNZ.

THE blue diamond, aniline diamond, or wash diamond swindle, as it was variously called, was invented a few years ago. It is applied to off-coloured and slightly yellow diamonds ; these, if painted on the back with a dilute solution of aniline and alcohol, will lose their yellow colour and appear either perfectly white or a brilliant blue-white. This steel-blue tint cannot be removed by ordinary washing ; alcohol or some other solvent is required to do this, and if such a diamond thus treated is mounted in a water-tight or closed box setting it will pass for a long time undetected. The first illustrious discoverer in this field received six months' imprisonment in Paris for his reward. Although Cellini described improving the colour of a diamond so as to enhance its value threefold, it was not by the aniline method, however.

Diamond doublets are rarely met with, but they have occasionally been sold. A five carat pair of doublet earrings was purchased by one of the sharpest dealers in New York city, and he did not discover their true nature until he had removed them from the mountings. Doublets are about the only gem in which parts of the original gem are used. In this case two flat pieces weighing one and one-half carats each had been fastened on to represent the crown and table of the diamond and were then backed by a fine French plate. Their value was not one-fifth what it would have been had they been brilliants.

A great many off-coloured or slightly yellow diamonds are kept by brokers and other dealers, nicely cleaned and tastefully arranged on black cotton or in black or tinted paper (usually in black paper) in order to deceive the purchaser as to their true colour, and are shown in the evening at private residences. It is needless to point out, in view of the fact that no expert diamond merchant will buy a diamond in the evening, that they then probably "pay too dear for their whistle." If a coloured stone, particularly a shallow one, is set in platinum, it is often so sunk in the gold that the back is not visible. Coloured stones are also set with a foil, or with a backing of black paste to make them appear white. Who can look at a diamond that is of fine colour, flawless, of perfect form, cut and polish, and say that it is not an object of beauty ? One who has seen only inferior stones cannot have a correct idea of the true beauty of the diamond.

Most pieces of jewellery composed of rose diamonds, usually set with foil, turn dark, especially when set in silver. The dust which gathers around the mountings is not so readily removed as from the brilliants themselves, which the jeweller can brighten up with very little trouble. When roses are set open in the back they can be easily cleaned. Although far greater display for less money can be made with the rose diamond, the above objections are so strong that our leading jewellers have abandoned their use entirely, substituting brilliants, except in cases, where, owing to the very small size of the jewel only roses can be used. Brilliants perfectly cut weigh 60 to 100 to the carat ; rose diamonds often 400 to the carat, making over 15,000 brilliants and over 60,000 roses to the English troy ounce.

Notes sometimes appear in the personal columns of the dailies describing a certain necklace or set of jewellery which, "owing to financial embarrassment," some "widow" is willing to sell at a very low price. The buyer who avails himself of this opportunity, either for sweet charity's sake or from some more selfish motive, usually gets for his pains a lot of imperfect, spread and off-coloured stones, set with closed backs in silver and very effectively mounted. No diamond dealer under such circumstances would buy without first taking all the gems from their settings. Poor diamonds are often raffled off even at such places as church fairs. The gems are often placed in cases bearing the name of the leading jeweller, but the "winner" is quite apt to find that the stones are not worth ten per cent. of the stated value.

People will frequently buy a gem because the name of some reliable house appears upon the box which contains it. In such cases it is well to satisfy one's self as to Shakespeare's query, "What's in a name."

Many diamonds are purchased from pawnbrokers by parties who find a certain fascination in buying things that may have been acquired in a questionable manner. They feel that they are surely getting a bargain. It is needless to say that most pawnbrokers are very well informed as to the value of articles in their possession, especially diamonds, and profiting by the purchaser's air of wisdom they rarely hesitate to ask an exorbitant price. The same quality of stone might in almost every case have been purchased for less money and with much more satisfaction to the purchaser. The popular belief that one can buy cheap from pawnbrokers and at auctions is so well understood, that in Mexico, where the pawnbrokers are under Government patronage, dealers frequently place diamonds and other gems with them to be sold at auction on commission, and get better prices than they could in their own shops. Not all dealers that pretend to be pawnbrokers are really such. Many of them sell what they have purchased from other brokers at annual sales, and only do a little pawnbroking for show to assist them in disposing of their stock.

Before a diamond is offered for sale by a pawnbroker, it has generally been shown to from one to a dozen dealers and brokers, who have all had an opportunity to purchase it if they chose, or certainly to assure the owner of its true value. If it is anything exceptional it will surely find a purchaser. If it is imperfect, off-coloured, very much spread and will make it a big show for little money, it will in due time find a place in the pawnbroker's window.

Some brokers have been known to do quite a flourishing trade in the country and even in some of the larger towns by confidentially informing the customers, as an inducement, that they were

enabled to sell cheap because they had bought the stones from a "fence," or a receiver of stolen goods. Transactions of this character seem to have a strange fascination for those who are anxious to buy cheap. They do not reflect that, if true, the gems have been procured by burglary, theft, or even murder. It is needless to state that such buyers are usually duped, and that the stones they purchase are usually obtained from regular dealers. Who would think of buying a chair, table, or other household utensil under such a presentation?

By a previous understanding with the pledger, pawnbrokers sometimes loan on diamond rings or watches more than the articles are actually worth. The pledger then disposes of the ticket at a slight advance to a third party, who redeems the article at a high figure, fancying that he has a bargain. In London they have gone so far as to drop such tickets in the street, in the expectation that whoever finds it will redeem the pledge.

The prices paid to thieves for stolen diamonds are sometimes ridiculously small. A diamond worth 400 dols., which was torn from a lady's ear some years ago in Fifth Avenue, was sold by the thief for less than 20 dols., and many similar cases are on record. Diamonds are occasionally sold by dealers at less than their original cost to import, in order to procure ready money to ward off failure. In such cases legal steps have been taken to show that fraud was attempted, for, however small the amount of sacrifice claimed, dealers who compete in the same market immediately surmise that something is wrong.

It would be possible for a diamond to be stolen in any part of New York city and for it to appear 24 hours after in almost any jeweller's stock for sale. There are so many different grades of dealers or brokers that the thief would have no difficulty in selling to some fence, who in turn would sell to someone not particular as to the source of the stone, and thus, by successive steps, the stone might pass through a dozen hands in one day.

It would be impossible to identify a stone of one, two, or three carats of good colour and without flaws or some peculiarity of shape, just as it would be to recognise a single drop in a tumbler of water.

## Is a Safe now a Safe?

AT the meeting of the Liverpool section of the Society of Chemical Industry, on Wednesday, March 7th, Mr. Thomas Fletcher, F.C.S., gas engineer, of Warrington, gave a demonstration of the application of some new gas heating appliances, devised by himself for workshop emergencies, one of the feats of the evening being the fusion of a large hole in a plate of ¼inch thick wrought iron, in a few seconds, without preparation, and with apparatus which could be carried by a man up a ladder and used in any position. The Secretary, in the discussion which followed the experiments, raised the very serious point that with such apparatus as Mr. Fletcher had exhibited and used, a burglar-proof safe no longer existed, as it was simply a question of minutes to fuse a hole large enough for a man to enter in any wrought iron or steel door in existence. Chilled iron or steel were powerless to resist the small blowpipe Mr. Fletcher used, which would penetrate thick iron and steel plates as readily as ordinary carpenters' tools would penetrate wooden doors. The apparatus was devised by Mr. Fletcher for works repairs, and was noisy in action; but, as he explained, the apparatus could be made silent, and small enough to carry in a hand-bag. This is a very serious matter for bankers and others who have valuable property, and one which will have to be taken up at once by the safe and strong-room makers. It is very well-known that the professional burglar is ready to utilise the latest applications of science for his own ends; in fact, Mr. Fletcher's furnaces designed to assist in chemical research are well-known as being used by receivers of stolen goods to reduce plate and jewellery to ingots, and these furnaces may be seen in the detectives' museum at Scotland-yard. Bankers have already taken the alarm, and have visited Mr. Fletcher's works with the object of seeing the extraordinary ease with which large openings can be fused in heavy iron or steel plates. It is hardly necessary to say that Mr. Fletcher plainly declares his intention not to devise a silent form of the apparatus, which naturally would be required only for burglar's use, but the light-fingered profession will no doubt take the matter in hand, and most probably succeed in making the apparatus silent, a modification which Mr. Fletcher states can be made. During an interview with Mr. Fletcher on this very serious matter, a contemporary was informed that the present danger is possibly not so great as it appears, owing to the fact that the apparatus necessary to manufacture and prepare the silent arrangement is both costly and large, and as the person who prepares it must have fixed machinery and plant, he will most probably be one of the last to whom the enterprising burglar would apply for his apparatus.

## The Silver Duty and Hall-Marking.

UNDER the above heading, a correspondent of the *Sheffield and Rotherham Independent* writes:—The question of the duty on silver plate is once more brought to the front. Present circumstances are very favourable for its abolition, a step which is quite necessary before the laws regulating the manufacture and marking of silver wares can be put upon a rational and consistent basis. At present those laws and regulations are without system, some classes of silver goods being rigidly compelled to pay duty, while other classes, often containing a greater weight of the metal, are entirely exempted. The abolition of the duty would have been accomplished years ago but for the existence of a difficulty which no Chancellor of the Exchequer has hitherto been able to surmount. The trade require a drawback on their stocks as duty has been paid on them, and the difficulty of arriving at an adjustment which would be satisfactory both to the Government and the trade has not yet been got over.

For a good many years Chancellors have had to plead poverty as an excuse for not dealing boldly with the subject; but it is rumoured that a change for the better is now being experienced, and no one in the country is better qualified to deal with the silver question than Mr. Goschen, who was a member of the Parliamentary Committee which sifted it through and through some seven or eight years ago, and concluded by condemning the duty and recommending its abolition as soon as it could be. No member of the Committee showed so perfect an acquaintance with the subject in all its details as Mr. Goschen, and a very prominent member of the trade will not soon forget the heckling he was subjected to by him on the alleged sale of quantities of silver plate, foreign made, and of inferior quality, consequently in contravention of the law, by houses of whom better things might be expected.

Mr. Goschen voted not only for the abolition of the duty, but also for the abolition of compulsory hall-marking. Within the last fortnight Mr. Watherston was invited to attend a meeting of workmen in the gold and silver trades at Birmingham, where he had full scope given him for the explanation of his views, which include the abolition of the duty on gold and silver plate, of compulsory hall-marking, and of the licences for the manufacture and sale of gold and silver wares. The meeting gave Mr. Watherston a unanimous vote in his favour, a fact which will strengthen him in his appeal to Mr. Goschen. A similar vote from the workmen of Sheffield would be of like service in settling a troublesome question at once and for ever, and Mr. Watherston would gladly meet the men with a view to laying the subject before them, and having it discussed in a rational and friendly spirit. It rests with those who have influence among our local silversmiths to take the steps necessary for giving him a patient hearing, and he may be communicated with at his address, "12, Pall Mall East, London."

# The Theory of Adjustment.

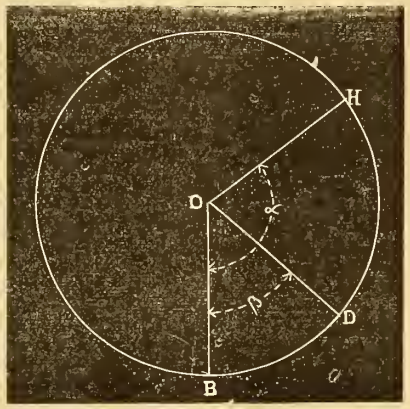
By M. L. Lossier.

After the Memoir of M. Jules Grossmann.—From the *Journal Suisse D'Horlogerie.*

FOURTH ARTICLE.—*(Continued from page 134.)*

SECTION 7.—*Formula of the Balance.*—We know now the influences in play in the movement of a balance: its moment of inertia and the moment of elasticity of the spring. We must now, in order to arrive at the formula expressing the duration of an oscillation, calculate, in the same way as we have done for the pendulum, the speed the balance will attain under these influences.

Let us consider (fig. 6) the point $B$ of a balance at rest, and make it retrograde as far as $H$: if, at this instant, we release it,




it will return to $B$ with an accelerated speed which will depend on the force of the spring and the moment of inertia of the balance.

The expression of this speed comes to the aid of the mechanical laws of work.

We know* that half the live force $\frac{1}{2} m v^2$ of a body in motion represents the work $T r$ stored by this body :—

$$T r = \tfrac{1}{2} m v^2;$$

by multiplying and dividing the second number of the equation by $r^2$, which does not change its value, we shall have

$$T r = \tfrac{1}{2} m r^2 \times \frac{r^2}{r^2}.$$

But the term $m r^2$ represents (section 4) the moment of inertia $A$, the term $\frac{r}{r}$ represents an angular velocity $\Omega$ ; $\frac{r^2}{r^2}$ may then be written $\Omega^2$, and the expression of work accomplished by the balance, starting from $H$ under the influence of the spring, and arriving at $B$ with the angular velocity $\Omega$, will be :

$$T r = \tfrac{1}{2} A \Omega^2. \qquad (a)$$

On the other hand, the same work may be represented by the force in play multiplied by the space travelled over. † The force in play at the point $H$ is the moment of the force of the spring, or $M \alpha$ ; at the point $B$ the force is null ; the mean of $H$ and $B$ is then $\frac{1}{2} M \alpha$, and the work done by this force will be $\frac{1}{2} M \alpha$ multiplied by the space traversed $\alpha$, or $\frac{1}{2} M \alpha^2$ ; then

$$T r = \tfrac{1}{2} M \alpha^2. \qquad (b)$$

By equating the expressions $(a)$ and $(b)$ of the work, it becomes :

$$\tfrac{1}{2} A \Omega^2 = \tfrac{1}{2} M \alpha^2,$$

from whence

$$\Omega^2 = \frac{M}{A} \alpha^2$$

and

$$\Omega = \alpha \sqrt{\frac{M}{A}}, \qquad (16)$$

* *Mécanique de Bocquet*, I., p. 179.

† *Mécanique de Bocquet*, I., p. 168.

angular velocity of the balance, starting from $H$ and arriving at the point $B$.

In the same way, calling $\omega$ the angular velocity in any point $D$ of the course, we shall have

$$T r = \tfrac{1}{2} A \omega^2.$$

The work done from $H$ to $A$ is, as we have seen, $\frac{1}{2} M \alpha^2$; the work from $D$ to $B$ will be, in like manner, $\frac{1}{2} M \gamma^2$, and the work from $H$ to $D$ will be the difference between the two, or

$$T r = \tfrac{1}{2} M \alpha^2 - \tfrac{1}{2} M \gamma^2,$$

or, making $\frac{1}{2} M$ a common factor,

$$T r = \tfrac{1}{2} M (\alpha^2 - \gamma^2).$$

We equate the two expressions of work, and put

$$\tfrac{1}{2} A \omega^2 = \tfrac{1}{2} M (\alpha^2 - \gamma^2),$$

from whence

$$\omega^2 = \frac{M}{A} (\alpha^2 - \gamma^2)$$

and

$$\omega = \sqrt{\frac{M}{A} (\alpha^2 - \gamma^2)},$$

an explanation identical to that found for the velocity of the pendulum at a point $D$ of its course.

It only remains now, knowing the angular velocity of the balance, for us to calculate the duration of an oscillation; and, for that, we shall proceed as for the pendulum, by assimilating the motion of the balance to the projection upon a straight line of a uniform circular movement, of velocity

$$\Omega = \alpha \sqrt{\frac{M}{A}}.$$

It is superfluous to repeat here the reasoning, which is exactly that which we have followed for the pendulum (Section 1), in the same terms and with the same designations of letters. We thus find, for the duration of an oscillation :—

$$T = \pi \sqrt{\frac{A}{M}},$$

a formula which we had admitted at the outset, by analogy with that of the pendulum.

Let us observe, meanwhile, this difference, that for obtaining the formula for the pendulum we have to assume the amplitudes to be so small that the chord can be confounded with the arc, while for the balance we have not any such restriction to make.

It results that, since $T$ is independent of the angle $\alpha$ travelled over, the oscillations of a balance should be absolutely *isochronous*. This is, besides, a logical consequence of the fact demonstrated at Section 5—that the force of a spring is proportional to the angle which it has turned. When the angle becomes twice, three times greater, the force acting upon the balance becomes twice, three times greater: the speed augments proportionally, and consequently the time $T$ remains the same.

Nevertheless, isochronism is only practically realisable as far as no exterior influence tends to disturb the functions of the spring. But, in a watch, these disturbing influences are numerous, and it is their detailed study which will form the subject of subsequent chapters of this work.

By following the same reasoning as at Section 2,

$$t = \sqrt{\frac{A}{M}} \text{ arc sin } \frac{\gamma}{\alpha} \qquad (17)$$

is found as the expression of the duration of a fraction of an oscillation.

Section 8.—*Applications.*—

*Problem I.—To calculate the time during which a watch balance, beating $\frac{1}{5}$ second, remains in contact with the escapement, the total lift being 30° and the amplitude 540° ($1\frac{1}{2}$ turn).*

The total lift is distributed on two sides of the dead point, as we count the angles at starting from this point, $\gamma$ will be equal to 15° and $\alpha$ to 270° ; then

$$\frac{\gamma}{\alpha} = \frac{15}{270} \; 0.05555 = \sin 3° \; 11' \; 5''.$$

The arc of which the sine is 0.055, or the arc of an angle of 3° 11′ 5″ value 0.05558.

On the other hand,

$$\sqrt{\frac{A}{M}} = \frac{T}{\pi} = \frac{0.2}{3.1416} = 0.063662.$$

We shall have then

$$t = \sqrt{\frac{A}{M}} \text{ arc sin } \frac{\gamma}{\alpha} = 0.063662 \times 0.5558 = 0.003538 \text{ sec.}$$

and for the total angle of 30°

$$t = 0.007077 \text{ sec.}$$

*Problem II.—To find the thickness a spring should have under given conditions.*

We retake for this the equation (3), where we will replace $M$ by its value drawn from (15), that is,

$$M = \frac{E\, e^3\, h}{12\, L},$$

and we shall have

$$T = \pi \sqrt{\frac{12\, A\, L}{E\, e^3\, h}}. \tag{18}$$

Raised to the square it becomes

$$T^2 = \frac{12\, \pi^2\, A\, L}{E\, e^3\, h},$$

from whence

$$e = \sqrt[3]{\frac{12\, \pi^2\, A\, L}{T^2\, E\, h}}. \tag{19}$$

Example (the same as at Section 4) :—

Let $A = 0.00416$;
$L = 265^{\text{mm.}}$;
$h = 0.22^{\text{mm.}}$;
$T = 0.2''$;
$E = 26000000$;

we shall have,

$$e = \sqrt[3]{\frac{12 \times 9.86 \times 0.00416 \times 265}{0.04 \times 26000000 \times 0.22}} = \sqrt[3]{0.000571},$$

or

$$e = 0.083^{\text{mm.}}$$

We have assumed in this calculation that the section of the spring is a rectangle. In reality, the little edges are rounded, and, in order to have absolute exactitude, this modification of form should be taken into account. Nevertheless, the difference which results is insignificant.

*Problem III.—To find how much a spring ought to be lengthened or shortened to obtain a difference of $\alpha$ seconds in the daily going of the watch.*

Let $T$ be the duration of the oscillation required, $N$ the number of oscillations in 24 hours, and $L$ the length of the spring which will correspond with these data; $T'$, $N'$, $L'$, the same factors before their modification. We shall have from (18) :

$$T = \pi \sqrt{\frac{12\, A\, L}{E\, e^3\, h}} \text{ and } T' = \pi \sqrt{\frac{12\, A\, L'}{E\, e^3\, h}}. \tag{20}$$

Dividing the first of these equations by the second, we shall have

$$\frac{T}{T'} = \sqrt{\frac{L}{L'}}.$$

On the other part, it is evident that the numbers of oscillations per day are in inverse ratio to their duration, then

$$\frac{T}{T'} = \frac{N'}{N}.$$

Calling $n$ the number of oscillations the watch ought to make per second, we shall have

$$N' = N \pm a\, n,$$

with $a$ positive if the watch gains, and negative if it loses.

We have then, in observing that $\frac{N}{n} = 86400$, the number of seconds that pass away in one day :—

$$\frac{T}{T'} = \frac{N \pm a\, n}{N} = 1 \pm \frac{a\, n}{N} = 1 \pm \frac{a}{86400} = \sqrt{\frac{L}{L'}} \tag{21}$$

and

$$\frac{L}{L'} = \left(1 \pm \frac{a}{86400}\right)^2,$$

or

$$L = L' \left(1 \pm \frac{a}{86400}\right)^2, \tag{22}$$

from whence we are able to calculate with all the exactness desired, the length to give to the spring.

If, as is generally the case, $a$ is small relatively to 86400, we shall be able to disregard the square of $\frac{a}{86400}$ and put

$$\left(1 \pm \frac{a}{86400}\right)^2 = 1 \pm \frac{2\, a}{86400},$$

from whence

$$L = L' \pm L' \times \frac{a}{43200}.$$

*Numerical Example.*—Let $a = 60$ seconds : we shall have

$$L = L' \pm \frac{L'}{720} \text{ and } L - L' = \pm \frac{L'}{720}.$$

Let $L' = 265^{\text{mm.}}$, which is about the length of a Breguet spring of a watch, $43^{\text{mm.}}$ of which the balance is $19^{\text{mm.}}$ in diameter, the length which it will be necessary to modify the spring will be—

$$L - L' = \pm \frac{265}{720} = 0.368^{\text{mm.}}.$$

For calculating *practically* the length of a spring, the approximate formula is used :—

$$L = (r' + r'')\, \pi\, n,$$

in which $r'$ and $r''$ indicate the radius of the smallest and largest spiral, and $n$ the number of spirals.

*Problem IV.—How much is it necessary to modify the weight of the balance to obtain a change of $\alpha$ seconds in the daily rate?*

Let us call $p$ the weight to add to or lessen, and $r$ the distance of this weight from the centre; the moment of inertia of the balance will become by the addition of this weight :—

$$A = \frac{P}{g} + R^2 \pm \frac{p}{g} \times r^2.$$

Let us substitute this value of $A$ in the first of the equations (20) and, in the second, the value

$$A = \frac{P}{g} \times R^2.$$

Dividing the one by the other, we shall have, after (21),

$$\frac{T}{T'} = \sqrt{\frac{P\, R^2 \pm p\, r^2}{P\, R^2}} = \pm \frac{a}{86400};$$

raising to the square, and multiplying the whole by $P\, R^2$, we have

$$P\, R^2 \pm p\, r^2 \quad \left(1 \pm \frac{a}{86400}\right)^2 P\, R^2 ;$$

or

$$P\, R^2 \pm p\, r^2 = P\, R^2 \pm P\, R^2 \times \frac{2\, a}{86400} + P\, R^2 \left(\frac{a}{86400}\right)^2,$$

from whence, by simplifying,

$$p = \pm \left\{ \left(\frac{a}{86400}\right)^2 \pm \frac{2\, a}{86400} \right\} \frac{P\, R^2}{r^2}. \tag{24}$$

The weight to add will then require to be so much greater as it will be placed nearer to the centre.

If the fraction $\frac{a}{86400}$ is very small, its square may be disregarded without inconvenience, we shall have then

$$p = \pm \frac{2\, a}{86400} \times \frac{P\, R^2}{r^2}. \tag{25}$$

Let $a = 60''$, $R = 8.25^{mm.}$, $r = 9.5^{mm.}$. The weight will be increased or diminished at the extremity of the screws, and we shall have

$$p = \pm \frac{1}{720} \left(\frac{8.25}{9.5}\right)^2 P,$$

or

$$p = \pm 0.001047\ P.$$

That is to say that, in order to obtain a difference in going of 1′ per day, it will be necessary to add to the extremity of the screw-heads a weight equal to a millionth of the weight of the balance.

The approximate formula (25) can naturally only be employed as long as it relates to small differences; otherwise the square $\left(\frac{a}{86400}\right)^2$ neglectable.

Nevertheless, this practical rule is very convenient in most cases.

*Numerical Example.*—A balance of a lever watch $43^{mm.}$ weighs $0.477^{gr.}$, and measures $7.5^{mm.}$ interior radius (of gyration), and $8.9^{mm.}$ exterior radius; the watch loses 73 seconds a day. What alteration must be made to the balance in order to correct the performance of the watch?

Let us renew the formula (25):

$$p = \pm \frac{2\ a}{86400} \times \frac{P\ R^2}{r^2};$$

replacing the letters by the figures of our example, it becomes

$$p = \frac{2 \times 73 \times 0.477 \times \overline{7.5}^2}{86400 \times \overline{8.9}^2}, \text{ or } p = 0.00057^{gr.}.$$

By distributing this weight of 57-hundredths of a milligramme upon two opposite regulating screws, as besides a screw-head (height $0.9^{mm.}$, weighs $7^{m.}$), it will be necessary to reduce each head $\frac{1}{25}^{m.}$ of its thickness, or 36-thousandths of a millimètre.

These quantities, small as they appear, are still, with good measuring instruments—a Standard trial balance and a Thury micrometer—sufficiently appreciable to allow of correcting the performance of the watch by this means, so that the error does not exceed five seconds a day.

*(To be continued.)*

## Gold and Silver Keys.

By J. W. Tonks.

At a meeting of the Birmingham Architectural Association, held in Queen's College, Paradise Street, on February 28, a paper was read on the above subject by Mr. J. W. Tonks. The Lecturer pointed out that in old days the key was an important safeguard, in iron or steel, where accuracy, strength and soundness of construction were the leading considerations. Until these had been secured, fortified by the best science of the time, the artist was not allowed to touch the guardian of the holy offerings or the royal treasure. When he did appear he was only permitted to work in strict subordination to the main purpose of the key itself. In the palmy days of the art of the goldsmith and silversmith, when caskets, altars and treasure boxes were made in the precious metals, doubtless keys of similar material were manufactured. Yet they hardly received a passing notice. In the wonderful exposition of specimens of ancient art at the Trocadero, Paris, in 1878, there were a few specimens of silver keys; yet all in close keeping with the examples to which they belonged. A gold key, set with gems, said to be Spanish, and of dubious antiquity, had been seen by the writer, and a series of specimens of Chamberlains' keys of office, two in the Birmingham Art Gallery and others in South Kensington Museum, were referred to, the more important ones being described. To explain the paucity of examples, however, the lecturer quoted from M. Labarte's work on the goldsmith's art in the Middle Ages, showing how necessity, the repeated disorders of centuries, and fashion—that goddess of change, whose destructive worship belonged to every age—had combined to cause the breaking up of the finest specimens of the art. It, nevertheless, had come to be a fact that modern practice had entirely changed. Exhibitions, public buildings and institutions, opened with ceremony by benefactors or notable personages, were lacking in an essential feature if a presentation key did not mark the occasion. This often represented the entire sum set apart for art amid much feasting and ephemeral display; but the conditions of the key were altered. Only needed for use on one occasion, while sound construction must have a place, its artistic beauty and emblematic reference to the occasion were the chief requisites in its design. This new departure involved a striking change in the size, form and treatment of the key. A contrast of the steel key, massive and utilitarian, supplied by Messrs. Chubb, for the opening of the Dublin Exhibition in 1865, with the gold key for the Colonial and Indian Exhibition, presented in 1886 by Sir George H. Chubb to the Queen at the opening ceremony, was given as showing the change which 21 years had brought about. Although this latter key was arranged to open the 500 locks of the Exhibition, its leading characteristics were æsthetic. The key for the Manchester City Hall, produced by Messrs. Elkington & Co., under the direction of Mr. Waterhouse, the working part of steel, with a head of gold, was instanced as marking a half-way stage. The gold key of Messrs. C. Smith & Sons, for the opening of the Leeds Free Library and Museum, designed by Mr. Watson, the architect of the building, was regarded as a massive yet noble attempt to reconcile the present with the past. The gold key for Wolverhampton Park, opened in 1881; also the one presented to the late Mr. Colin Minton Campbell in 1883, and manufactured by Messrs. Bragg, still retained the mediæval instinct. The key presented to Mr. John Bright, M.P., on the opening of the Cobden Coffee House, and made by the latter firm, was instanced as indicating the growth of the modern spirit. The key brooch in gold, enamel and gems, presented to Lady Leigh in 1884, on the occasion of the opening of the Eye Hospital, was entirely artistic and emblematic. It was a great question whether the glories of the steel key of the mediæval period would ever be restored, and they might even hope that the coming of the golden age in keys might bring with it a precious and vivified art, as much surpassing the iron age as did the richer material in all the qualities that were most highly prized.

## The Lever Escapement

CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. Grosclaude, Professor at the Geneva School of Horology.

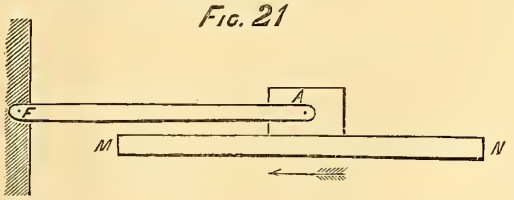
(Translated from the French.*)

*(Continued from page 137.)*

* We are informed by M. E. Gardy that the above article was originally written for the *Journal Suisse d'Horlogerie;* our translation is from a pamphlet published in Geneva.

In practice, engaging and disengaging friction is often heard spoken about. We shall proceed to examine this question a little closer, in order to ascertain what amount of truth there is in the generally admitted opinion that engaging frictions should be avoided as much as possible, as offering a greater resistance than the disengaging frictions.

*Fig. 21*




Let us imagine any body, A (fig. 21), placed upon a surface more or less polished, M N. The coefficient of friction known,

it will be easy for us to determine the effort necessary to make in order to make the body slide upon the surface of the plane.

Let us assume now that the body A is maintained by a rigid piece, F A, at an equal distance from a fixed point, F, being free to exercise a pressure by its weight upon the surface. If we move the plane, the resistance due to friction is the same, because in both cases the relative movements of the body of the plane are identical.

If, on the contrary, the rigid arm A F occupies an inclined position with respect to the moveable plane (fig. 22), and we move

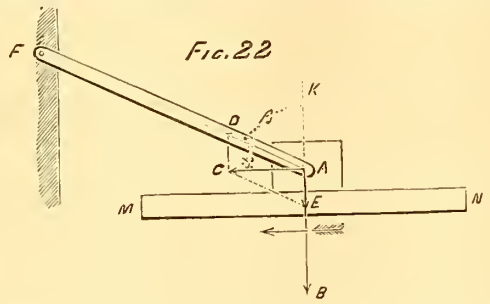


Fig. 22

the latter in the direction of the arrow, will the resistance to be overcome be the same? Evidently not: it will be greater—whereas, if the movement of the plane were inverse, it would be, on the other hand, less. We proceed to determine the exact value.

Let us draw the line A B so as to represent in length the value of the intensity of terrestrial attraction upon the body A. There exists between the body and the plane a friction which acts in the direction A C, if the plane is moved in the direction following the arrow. But this friction has the effect of causing the body A to press still more strongly upon the plane M N, which evidently further augments the friction. We appear to be in a dilemma for determining this friction; we shall obtain it, however, easily in the following manner, by having recourse to algebra:—

We will represent the total friction by the line A C, which, in order that we can know its influence, should be resolved into two other forces: one, A D, in the direction of the rigid arm A F, and the other, A E, perpendicular to the plane M N.

The total pressure exerted by the body A upon the plane M N is now, then, A B + A E, and the resulting friction is f × (A B + A E), *f* being the coefficient of friction; and as we have represented the total friction by A C, there results the equation—

$$A\,C = f \times (A\,B + A\,E).$$

For greater simplicity we will designate by P the weight of the body which we have represented by the line A B; and if we call $\alpha$ the angle which the arm A F makes with the plane, the quantity A E may be replaced by A C × t g $\alpha$. We will write, then—

$$A\,C = f \times (P + A\,C \times t\,g\,\alpha,$$

from whence, $A\,C = f \times P + f \times A\,C \times t\,g\,\alpha$,

and seeking the value of the friction A C,

$$A\,C - f \times A\,C \times t\,g\,\alpha = f \times P,$$

from whence, $A\,C = \dfrac{f \times P}{1 - f \times t\,g\,\alpha}$.

It is this formula which will enable us to ascertain the friction to be overcome in each particular case.

Assume the case of figure 21, that is to say where the arm A F is parallel to the plane: the angle $\alpha$ being *nil*, the quantity f × t g $\alpha$ disappears from the formula, and it remains A C = f × P, a result which we already know. Now, if the arm A F is not parallel to the plane, the greater the angle it makes with it, the greater importance will be the quantity f × t g $\alpha$; so that, having to divide by a quantity smaller than 1, the friction will be always superior to f × P. If, on the other hand, we go beyond the angle of 90°, the value of t g $\alpha$ becomes negative; the denominator will be in this case greater than 1, and the friction less than f × P. We prove here, then, the difference between engaging and disengaging friction.

If we wish to ascertain, in order to avoid it, the position for which the friction is considerable, we see that the value $\dfrac{f \times P}{1 - f \times t\,g\,\alpha}$ will be great when the numerator, that is to say, when the coefficient of friction *f*, or, again, the weight of the body P, is great. This is easily seen; but there is still a case where, even with an ordinary weight and coefficient of friction, the friction will be considerable: this is when the denominator of our fraction is small, or, better still, nothing. We shall then have a curve that will prevent all movement if the plane M N is forced to move in the direction of the arrow. For this particular case we must then put

$$1 = f \times t\,g\,\alpha = 0,$$

from whence we deduce $f = \dfrac{1}{t\,g\,\alpha}$,

$$\text{or } f = t\,g\,\beta,$$

calling $\beta$ the angle which the arm A F makes with the vertica A K.

The different values which this formula takes are represented graphieally (fig. 23) for the four coefficients, 0.10, 0.20, 0.30

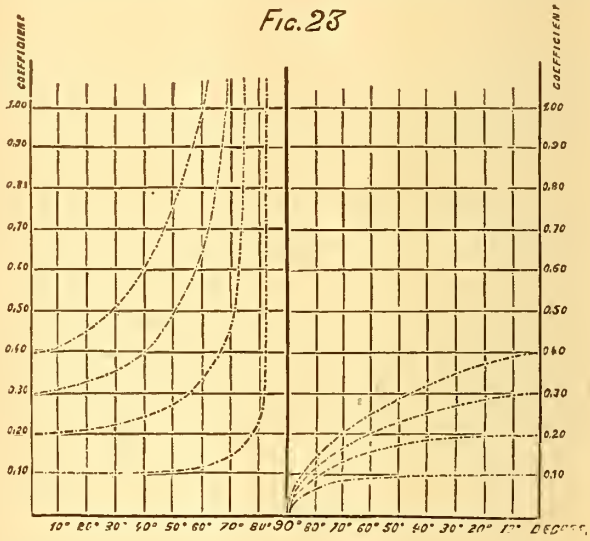


Fig. 23

and 0.40. We see that, for weak coefficients, such as 0.10, the friction is hardly increased, and that the abutting are presents itself suddenly, while, for strong coefficients, the increase promptly makes itself felt.

Let us return to our first explanation of friction, which assumes the surfaces to be covered with asperities formed of two inclined planes, of which the slope is the same as the coefficient of friction. If the direction of the arm A F (fig. 24) is perpendicular to the face of the asperity, the curve will exist; but the angle which the arm makes with the perpendicular A K to the plane M N is the same as that of the face of the asperity; our method of considering the friction is, then, here again confirmed by the calculation.

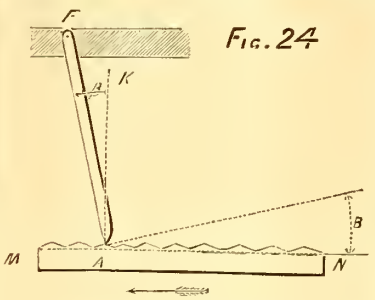


Fig. 24

From the preceding it results that the curve will take place every time the direction of the arm makes, with the perpendicular to the plane, an angle of which the trigonometrical tangent is equal to the coefficient of friction. This last value may be found in all collections of trigonometrical tables; nevertheless, for those of our readers who do not wish to make these researches, we transcribe here some values of coefficients of friction corresponding to angles from 0° to 17°, the values of angles corresponding to coefficients from 0.05 to 0.25:—

| Angles in Degrees. | Coefficients of Friction. | Angles in Degrees. | Coefficients of Friction. |
|---|---|---|---|
| 1° ... ... | 0.017 | 10° ... ... | 0.176 |
| 2° ... ... | 0.035 | 11° ... ... | 0.194 |
| 3° ... ... | 0.052 | 12° ... ... | 0.213 |
| 4° ... ... | 0.070 | 13° ... ... | 0.231 |
| 5° ... ... | 0.087 | 14° ... ... | 0.249 |
| 6° ... ... | 0.105 | 15° ... ... | 0.268 |
| 7° ... ... | 0.123 | 16° ... ... | 0.287 |
| 8° ... ... | 0.141 | 17° ... ... | 0.306 |
| 9° ... ... | 0.158 | | |

| Coefficients of Friction. | Angles in Degrees and Minutes. | Coefficients of Friction. | Angles in Degrees and Minutes. |
|---|---|---|---|
| 0.05 ... ... | 2° 52′ | 0.18 ... ... | 10° 12′ |
| 0.10 ... ... | 5° 43′ | 0.19 ... ... | 10° 45′ |
| 0.11 ... ... | 6° 17′ | 0.20 ... ... | 11° 19′ |
| 0.12 ... ... | 6° 50′ | 0.21 ... ... | 11° 52′ |
| 0.13 ... ... | 7° 24′ | 0.22 ... ... | 12° 24′ |
| 0.14 ... ... | 7° 58′ | 0.23 ... ... | 12° 57′ |
| 0.15 ... ... | 8° 32′ | 0.24 ... ... | 13° 30′ |
| 0.16 ... ... | 9° 5′ | 0.25 ... ... | 14° 2′ |
| 0.17 ... ... | 9° 39′ | | |

*(To be continued.)*

# Gazette.

## Partnerships Dissolved.

Marsden & Frost, Sheffield, ivory cutters. J. & M. Buckley, Manchester, pawnbrokers. Jepson & Baron, Garston, Lancashire, pawnbrokers. Lee & Law, Sheffield, pawnbrokers. H. Fitter & Sons, Birmingham, gold chain makers. E. Shilton, J. Shilton and C. Carey, Birmingham, ivory turners.

## THE BANKRUPTCY ACT, 1883.

### Receiving Orders.

*To surrender in London.*—Septimus Cooper, Piccadilly, ivory brush manufacturer.

*To surrender in the Country.*—Edgar George Miller, Cheltenham, watchmaker. Francis William Payton, Birmingham, diamond mounter. William Morris, Cardiff, watchmaker. Edward T. Windibank, Upper Norwood, watchmaker. William Coady, Hanley, watchmaker.

### Public Examinations.

*In the Country.*—G. Lewis, Kingston-on-Thames, watchmaker; May 4, at 3.30. F. W. Payton, Birmingham, diamond mounter; April 16, at 2. W. Morris, Cardiff, watchmaker; April 13, at 10.30.

### Adjudications.

*In London.*—W. P. Pugh and E. Pugh (trading as Pugh Brothers), Queen Victoria Street and elsewhere, heraldic engravers.

*In the Country.*—E. G. Miller, Cheltenham, watchmaker. G. Lewis, Kingston-on-Thames, watchmaker. S. Southey, Manchester, jeweller. A. C. Primavesi, Reading, watchmaker. W. Coady, Hanley, watchmaker.

### Notices of Dividends.

*In London.*—F. W. Robinson, Fenchurch Street, watchmaker; 2s. 6d., first and final; September 13, 5, Hatton Garden, E.C. T. W. Harris, Brook Street, Grosvenor Square, jeweller; 6d., first; any Wednesday, Seear, Hasluck & Co., 23, Holborn Viaduct. M. Sugar, Holborn Circus, fancy goods dealer; 1s. 2½d., first and final; P. Mason & Co., 29 & 30, King Street, Cheapside.

*In the Country.*—R. Kneeshaw, Pickering, Yorks, watchmaker; 2s. 8d., first and final; any day, Official Receiver, Scarborough. F. R. Lineham, Scarborough and Newark-on-Trent, watchmaker; 2s. 2d., first and final; any day, Official Receiver, Scarborough. J. Jennings, Surbiton, watchmaker and jeweller; 3s. 4d., first; Official Receiver, 28 & 29, St. Swithin's Lane, E.C. B. Sargent, St. Leonard's-on-Sea, jeweller; 1s. 2d., first and final; forthwith, F. G. Clark, Brighton. L. Brunner, Birmingham, watchmaker; 1s. 0¾d., first and final; 120, Colmore Row, Birmingham. J. Green, Sheffield, pawnbroker; 9s. 3d., first; trustee, Rotherham.

## BANKRUPTCY.

BIRMINGHAM.—*Before His Honour Judge Chalmers, March* 15.

*In re* Samuel Bradley, 36, Vyse Street, wholesale jeweller and watch factor.—Mr. M. Hooper, on behalf of Mr. E. M. Sharp, the trustee, applied to his Honour for directions. He said that the debtor formerly held some freehold property in Blair Street, Edinburgh, but had pledged it with a creditor. The property was burdened with covenants for repairing, paving, &c., and, as it was mortgaged to its full value, the trustee wished to disclaim it. The difficulty which presented itself was that the Act did not apply to Scotland. In reply to his Honour, it was stated that the property consisted of the bottom flat of an eight or nine storeyed tenement above the Cowgate. The application was adjourned until next bankruptcy day, his Honour stating that he thought the Act applied to any part of her Majesty's dominions. However, he would consider the point. An application was then made by Bradley for his discharge. The Official Receiver reported that the petition was presented in October, 1887. The statement of affairs showed liabilities £17,793, and assets £3,359. The trustee anticipated paying a dividend of 2s. in the pound. The bankrupt had kept proper books, but had contracted debts after he knew he was insolvent. In May, 1886, a balance sheet had been prepared which showed a deficiency of £5,000. The bankrupt had continued to trade and to incur debts up to his petition. He had disposed of a few of his goods by pawning, and had paid heavy sums for discounting bills. His loss from May, 1886, to the time of his petition was £2,000. The Bankrupt, who was not represented, said that when he found himself insolvent in 1886 he consulted his largest creditor, and it was arranged that he should continue to carry on the business. Subsequently, finding it impossible to carry on under the then existing conditions, he again consulted his largest creditor, who agreed to reduce his debt one-half, and to give him eight years to pay it in. On that being done he was once more in a position of solvency, and the reason why he had to file was because the creditor referred to, who had acted as his banker, declined any longer to discount his bills. On his failure the creditor proved for the full amount of his debt, and the deficiency was explainable partly from that and partly from the depreciation in the value of the stock. He had bought some of the stock in at the sale on commission at 70 per cent less than invoiced prices. Mr. Hooper said that the experience of Mr. E. M. Sharpe was that jewellery goods fetched at a forced sale from 9s. to 11s. 3d. in the pound of their value. His Honour granted the bankrupt his discharge, subject to judgment being entered up for £1,200.

*In re* Henry Cohen Spiers, 42, Warstone Lane, manufacturer of gold chains and merchant. Application for discharge. Mr. E. Rowlands appeared for the bankrupt. Mr. Sharp, Official Receiver, reported that the petition was filed in November, 1884. The statement showed liabilities £12,747, and assets £6,500. The trustee had paid 4s. 7¼d. in the pound. The debtor had omitted to keep proper books; he had traded with a knowledge of insolvency; he had been guilty of hazardous speculation and unjustifiable extravagance of living; and had disposed of his goods otherwise than in the ordinary way of his trade. From 1881 to the petition he had drawn for maintenance an average of £750 a year: he had sold large quantities of gold to a friend in order to raise money, and had given a large amount of credit to a person named Lewison without properly ascertaining whether the man could pay, the result being only 8s. in the pound was recovered from Lewison. Two of the creditors spoke in favour of the debtor. Mr. Rowlands read a resolution passed by the committee of inspection. The committee resolved that "as the bankrupt had not profited by his bankruptcy——" The Judge: Is it usually a profitable transaction? Mr. Rowlands: I take it they sometimes put a little bit by; but the bankrupt in this case has given up everything; and the resolution goes on to say that the committee saw no reason to oppose his discharge. Mr. Sharp said the committee at an earlier stage passed a resolution that bankrupt's conduct was highly reprehensible. Mr. Rowlands having explained several points dealt with in the report, his Honour said he did not wonder at the jewellery trade being in a depressed state when those who paid 20s. in the pound had to compete with such reckless traders as this bankrupt. He should suspend the discharge for six years, and but for what the creditors had said he should have refused it altogether.

BRISTOL.

*Re* Mary Hannah La Trobe, 35, College Green, trading as S. H. La Trobe, watchmaker and jeweller. Replying to the Official Receiver, the debtor stated that when her husband died in 1882, she had a statement of her affairs prepared by Mr. Solomon Hare. She had a copy of that statement, which could be produced. Her husband died without a will, and she took out letters of administration. With regard to the statement referred to, the stock was valued by a competent person, and she believed the amount stated as the surplus was a *bonâ fide* one. Her children were minors at the time of her husband's death, and their money was left in the business. The examination was adjourned till the 23rd March.

GLASGOW.

Sequestration.—Robert Rankine, carrying on business at 7*a* Royal Bank Place, under the firm of Robert Rankine & Co., wholesale jewellers, was on March 12 examined in bankruptcy, in Glasgow Sheriff Court, before Sheriff Guthrie. There was also present Mr. John Miller, C.A., trustee, and Mr. James Andrew, writer, law agent in the sequestration. Bankrupt said he commenced business in November, 1886, with a capital of £4,000. He had no partner. At his stoppage his assets amounted to £7,580 1s. 10d., and his liabilities to £5,286 10s. 1d., leaving a surplus of £2,293 11s. 9d. He attributed his difficulties to having increased his stock too much in the depressed state of business. He endeavoured to get his creditors to extend the time for payment to enable him to realise his stock. The most of the creditors were willing to do so, but as one or two proceeded to do diligence against him he was forced to take out sequestration so as to prevent preferences being acquired. He had given full explanations to the trustee, who has expressed himself satisfied with them. The examination was closed.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

2,447. T. S. Evans and A. G. Woodward, London, for "Apparatus for receiving and thanking the donor (at the same time) on the reception of nearly all coins, bronze, silver and gold, for charitable and other institutions." Dated February 18, 1888.

2,486. Alfred Appleby, Birmingham, for "Braeelet wateh holder." Dated February 20, 1888.
2,526. Thomas W. Short and W. J. Mason, London, for "Improvements in refleetors used internally with aneroid barometers having visible movements." Dated February 20, 1888.
2,686. J. G. Rollason, Birmingham, "Improvements in, and additions to, brooches and other like personal ornaments." Dated February 23, 1888.
2,778. F. Trickett and J. Noad, London. "Improvements in the extraction of gold, silver and platinum from auriferous and argentiferous materials." Dated February 24, 1888.
2,828. F. C. Evershed, Brighton, for "An adjustable metal label or ticket for numbering, prieing or marking in other ways the stock of jewellers and others." Dated February 25, 1888.
2,846. A. Bertholet and L. Burri, London, for "Improvements in watch mechanism for use in combination with walking-stieks, umbrellas, and the like." Dated February 25, 1888.
2,949. H. Levetus, Birmingham, for "An improved pad for exhibiting ehains and other articles of jewellery." Dated February 28, 1888.
2,998. W. S. Harrison, London, for "Improvements in, or applicable to, synchronising mechanism for clocks." (Complete specifieation.) Dated February 28, 1888.
3,228. P. C. Bunn, London, for "An improved proeess of, and apparatus for, extracting gold and other metals from crushed ores and other auriferous materials." Dated March 2, 1888.
3,348. W. Atkins, Birmingham, for "Improvements in wateh keys." Dated March 5, 1888.
3,399. G. Huck, Burnley, for "Safety mainspring barrel watches." Dated March 6, 1888.
3,469. H. A. Lugrin, London, for "Improvements in stop watches." (Complete specifieation.) Dated Mareh 6, 1888.
3,525. T. Jepson, London, for "Improvements in keyless watches." Dated Mareh 7, 1888.
3,547. L. Q. Brin, London, for "Improvements in the method of, and apparatus for, making aluminium bronze." Dated March 7, 1888.
3,563. J. Vale and T. Vale, Birmingham, for "Improvements in, or additions to, pendants, brooehes, belt clasps, and other like articles." Dated March 8, 1888.
3,642. J. Hayward, London, for "Complete safety bracelet fastener in gold, silver or other wire." (Complete speeification.) Dated March 9, 1888.
3,742. T. Smith and H. J. Donkin, London, for "Improvements in watch keys or other keys of the like kind." Dated Mareh 10, 1888.
3,823. J. C. Butterfield, London, for "An improved method for the extraction of metals from eomplex ores." Dated March 12, 1888.
3,926. G. de Wolf, London, for "Improvements in the humid method of extracting gold and other metals from refraetory and other ores." Dated March 14, 1888.
4,219. A. J. Harvey, London, for "Improvements in, or relating to, sleeve and similar links." Dated Mareh 19, 1888.
4,271. E. Ray, London, for "A clock or time-keeper and time flashing disc combined." Dated March 20, 1888.
4,375. T. Sharples, Halifax, for "Improvements in the eonstruction of brooches." Dated March 22, 1888.
4,418. C. D. Abel, a eommunication from MM. Rotten, Germany, for "Improvements in the extraetion of gold and other preeious metals from minerals and ores containing them." Dated Mareh 22, 1888.

## Recent American Patents.

| | |
|---|---|
| Chronometer Escapement. Paul T. A. Rodeck ... ... ... | 377,839 |
| Clock Striking Mechanism. L. Halsvorsen ... ... ... | 377,558 |
| Combined Cigar Cutter and Match Box. O. P. Elterich ... | 377,550 |
| Combined Paper Weight and Pen, Pencil or Cigar Holder. G. L. Fuller ... ... ... ... ... ... ... ... | 377,726 |
| Combining Metals with Aluminum. William A. Baldwin ... | 378,278 |
| Cuff Holder. John D. Hall ... ... ... ... ... ... | 377,753 |
| Display Stand for Non-Magnetic Watches. A. C. Smith ... | 378,339 |
| Machine for Making Chain. Julius Kinder ... ... ... | 378,252 |
| Music Box. Auguste L'Epée... ... ... ... ... ... | 378,399 |
| Process of Electrolyzing Copper. E. S. Hayden ... ... | 377,487 |
| Railway Time Signal. John F. K. O'Connor ... ... ... | 377,497 |
| Safety Catch for Breast Pins ... ... .. ... ... ... | 378,054 |
| Separating Precious Metals and Impurities from Solutions of Copper, Salts, Ores, Mattes, &c., in Acids. Thomas Kiddie | 377,809 |
| Setting for Ornaments. William C. Edge... ... ... ... | 378,043 |
| Stop Watch. Edouard Heuer ... ... ... ... ... | 377,896 |
| Stop Watch. Edouard Heuer ... ... .. ... ... | 377,897 |
| Striking Mechanism for Clocks. Emile Groux ... ... ... | 377,935 |
| Wash for Cleaning and Polishing Jewellery. A. W. Isaacs ... | 15,167 |
| Watch Springs, Method of Making. John Logan ... ... | 377,489 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. Truslove, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Correspondence.

*All Letters for Publication to be addressed to the* Editor *of* The Watchmaker, Jeweller and Silversmith, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Dear Sir.—Will you kindly answer the following questions in next month's issue of *The Watchmaker and Jeweller?*

(1) Use of dampers on comb of musical box?

(2) Why a jarring sound is caused; is it owing to the dampers not being in place?

(3) Should dampers touch points of comb?

(4) Any other information respecting musical box repairing, as to whether cleaning comb with emery cloth would effect tone, &c.

If you will kindly answer questions in next issue you will oblige one of the readers of *The Watchmaker and Jeweller.*

Yours respectfully,
W. H. Smith.

[Ed. (1) To prevent jarring. (2) Yes, that is one cause; the dampers require adjustment; (3) No. (4) We will try to obtain and forward you a pamphlet on the subject.]

## Buyers' Guide.

The

# Watchmaker, Jeweller & Silversmith.

EDITED BY D. GLASGOW, JUN.

*Entered at Stationers' Hall.*] [*Registered for Transmission Abroad.*

VOL. XIII.—No. 11.] MAY 1, 1888. [Subscription, 5s. per Annum. { Post Free

CONTENTS.



## The Watchmaker, Jeweller and Silversmith.

**A Monthly Journal** devoted to the interests of Watchmakers, Jewellers, Silversmiths and kindred traders.

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## Editorial.

IN the death of the Rev. C. W. King, Senior Fellow of Trinity College, Cambridge, which took place on March 29, the country has lost its greatest authority in the archæology of gems, antique and gnostic, their history, characteristics, and the legends concerning them. Mr. King's works on the subjects alluded to secured for him lasting distinction among scholars who have made the history of works of art their study. They comprise, besides numerous shorter essays contributed to the journals of archæological societies, "Antique Gems," 1860, the original staple of other works published at later dates on sections of the subject at large, being "The Natural History of Precious Stones," 1865; "The Handbook of Engraved Gems," 1866; "The Natural History of Gems, or Decorative Stones," 1867; "The Natural History of Precious Stones and of the Precious Metals," 1867; "Gnostics and their Remains," 1864; and "Antique Gems and Rings," 1872. Mr. King, whom we knew for years, was one of the most amiable of men as well as the most accomplished classical scholar. In conjunction with the Rev. H. A. J. Munro, the learned translator of "Lucretius," he brought out the famous edition of "Horace," illustrated with examples of antique gems. An all-round man, and a valuable member of the Royal Archæological Institute, he was an authority on time-keepers from the period of the Clepsydra down to that of the latest improved watch. With Mr. Octavius Morgan's collection he was probably better acquainted than the owner himself.

CONSUL WOOLDRIDGE, in his report on the trade and industry of Barcelona for 1887, states that during the year the practice of German manufacturers of sending young men to find out the needs of the people, learn their language and industrial powers, and turn the information thus acquired to the account and advantage of their employers, has not been followed, so far as he has observed, by English manufacturers, although the latter would doubtless be able to compete successfully with the Spanish

manufacturers. High-class Sheffield and Birmingham goods, &c., have found good sales during the year, and will no doubt continue to find an excellent market. Mr. Wooldridge points out, however, that this success may be short-lived unless our home manufacturers make their goods more in accordance with the Spanish taste. English taste is in many ways different from Spanish taste, and if British manufacturers would adapt their goods more to the latter, the demand would be greater. French jewellery is preferred to English: and the Consul thinks it would be a wise proceeding for manufacturers of jewellery to send men to Paris to study the way jewellery is made there, and copy it. "The great drawback in English-made jewellery is that it is too massive. Parisian jewellery is lighter than the English—is similar in appearance, but is only half the expense." Although we cannot endorse this part of the report (being quite sure that, price for price, English-made jewellery is now of better quality than the French, and that if a want exists for shoddy goods, our home manufacturers can fill it against all comers), it should not escape attention, as showing the impression of one who, though possibly not technically, is generally well-informed, and whose facilities for obtaining information as to the state of the market are at least much greater than can be those of an ordinary non-official member of the community. Great discredit is stated to be brought on British-manufactured goods, such as cutlery, by Germans importing worthless articles and classing them as British, while the high-class British goods are marked and sold as German. Should our Consuls abroad do no more by their reports than keep our manufacturers alive to such tricks of trade as the above, the institution of the reports will prove of immense benefit to home producers, and perhaps enable them, by obtaining conventions with our own and various foreign Governments, to put a stop to such unfair proceedings.

We have received from the proprietor of the *Miller* a communication on the subject of the very unsatisfactory state of the Newspaper Acts which regulate the postal rates of monthly and bi-monthly newspapers, with a view to agitating for an alteration in the existing law. We shall be pleased to hear from those of our contemporaries and exchanges who would be willing to co-operate in a movement for the removal of an anomaly that presses so hardly upon those publications which, complying in other respects with the requirements, are debarred from obtaining the favoured rates, solely on the ground of being published at too long intervals of time.

Some time since the Birmingham police arrested a man and a woman on a charge of being in the unlawful possession of a quantity of jewellery, which was ascertained to have been stolen from a jeweller's shop in Melbourne, and the prisoners underwent several remands from time to time in order to enable the respective authorities to communicate with one another and establish the case for the prosecution.

Mr. Gourlay, of Collins Street, Melbourne (the jeweller from whom the goods were stolen), has—we learn from an Australian source—definitely informed the police authorities that, on account of the heavy loss he has already suffered by the theft of about £1,000 worth of jewellery, he has decided to take no proceedings against the prisoners. The cost of bringing the prisoners and the necessary witnesses to the Colony would amount to close upon £700, and the value of the jewellery recovered is only about £150. Official communications are to be, or have been, sent home with a view to the recovery of the jewellery which has been identified, the police having been instructed to do all in their power to secure the restitution of the property to Mr. Gourlay.

The state of the law is such, it appears, that, by Mr. Gourlay very naturally refusing to spend £700 in order to recover the £150 worth of goods found on the prisoners, not only does he run a risk of losing his goods so recovered, but by the time these lines appear in print, the prisoners will, in all likelihood, be at liberty. One who does not fully understand these matters would imagine that the evidence necessary to secure a conviction might have been taken on commission.

## General Notes.

The opening of the Brussels Exhibition has been postponed from the 5th to the 19th instant.

At a mass meeting of working men, held at the Rotunda, Liverpool, on April 20, among other resolutions passed was one calling for the abolition of the duties on gold and silver plate.

Mr. Barrington Brown, the expert sent by the Government to inspect the Burmah ruby mines, has now returned to Calcutta, and reports the mines in the Mogouk district to be of exceptional richness.

There has been a large falling off in the export of ostrich feathers from Africa to Europe. According to a consular report, the average value of the feathers exported from Tripoli has been for some years about £200,000 a year: but last year it was no more than £15,000.

The Goldsmiths' Company have given £100 to the fund for the purchase of John Wesley's chapel in West Street, Seven Dials. The chapel was reopened on Easter Sunday under the licence of the Bishop of London, and is now in regular use as a mission church connected with the London Diocesan Home Mission.

Opening of the Barcelona Exhibition.—Although still unfinished, the Barcelona Exhibition was opened on April 8. There was no special ceremony, and the public will only be admitted for three hours every day until the buildings have been completed. The official inauguration will, as previously announced, take place on May 15.

A fire, resulting in very considerable damage to the stock and premises, occurred last month at No. 5, Above Bar Street, Southampton, in the occupation of Mr. Arthur George Martell, watchmaker and jeweller. Mr. Martell supposes the fire to have originated in the nursery. He is insured in the Liverpool and London, the Queen, and Atlas Offices.

The Glasgow Exhibition.—We learn that all the preparations for the forthcoming International Exhibition in Glasgow are progressing satisfactorily, and that it is now definitely fixed that the opening will take place on May 8. The ceremony will be performed by their Royal Highnesses the Prince and Princess of Wales.

The Jubilee gifts offered to the Pope have been valued by experts, and, including the numerous money presents, they are estimated at nearly four millions sterling. The monks of the Chartreuse sent £20,000 in gold; one of the most valuable gifts is the large ring presented by the Sultan, which contains a magnificent and very large diamond.

The *European Mail* hears very little about the South Australian "rubies," and no sales of importance can be verified by inquirers. So long as this remains, sensible people will be doubtful of the reality of the value of the stones, notwithstanding all the glowing accounts and reports which are forthcoming concerning some portion of the stones which are over here.

Among the arrivals at the Leicester Midland Station, on March 25th, from St. Pancras, was Mr. Jones Woollf, aged 65 years, a retired watchmaker, residing at 22, Trinity Street, London, S.E., who was proceeding to Birmingham, but feeling unwell, broke his journey at Leicester. Mr. Emmerson, surgeon, was sent for, but death ensued before medical assistance could be procured.

The North Wales Gold Field.—Mr. Morgan, of the Dolgelly gold workings, stated last month, that from 334 tons of quartz, representing the cleaning up of one fortnight, he obtained 628 ounces of gold. This result is considered highly satisfactory, as it equals those of the best gold mines in the world, the average being two ounces to the ton, and less than a quarter of an ounce paying the cost of production.

The new dome which has recently been erected at Greenwich Observatory is made entirely of papier mâché. It is eighteen feet in diameter, and is designed for the Cooke 6-inch equatorial telescope, with a photo-heliograph attached to the same mount. It is so light that it can be rotated without the aid of machinery of any kind, and is said to be as strong as if it were constructed of wood or iron.

According to a Northern contemporary, since jewellery has been so little worn round the neck with low bodices, it has become necessary to find some other use for it, and a pretty fashion is coming in of joining the shoulder pieces of an evening bodice together with buckles or brooches instead of bows of ribbon. The old-fashioned long earrings, which with most ladies have lain idly by the last year or two, can be easily and inexpensively converted into these shoulder ornaments.

The Merchandise Marks Act continues to receive the attention of Colonial Governments. The Secretary of State thinks it probable that legislation on the lines of the Act will take place in India; and Baron H. de Worms, answering a question in the House of Commons last month, said since the last replies received from the Colonies, fourteen had promised legislation, three had introduced legislation, and in two others, ordinances had been passed.

The Plate Duties.—Mr. Slagg's resolution in condemnation of these duties, and of the principle of compulsory Hall-marking, will be brought forward in the form of an amendment to the Budget Bill in Committee as we go to press. It is expected that the Chancellor of the Exchequer will meet the amendment by an implied promise to deal definitely with the subject in 1889. The opponents of the tax believe that a majority of the House is in favour of an early settlement of the question.

The Etheridge Gold Field Company has just resolved to pay another interim dividend of 1*s.* per share, and to distribute a bonus among the shareholders equal to 4*s.* per share on fully paid up shares in the Elektron and Canadian Companies. Seeing that the Etheridge has not yet got to work, this is rather a bold course to pursue. Difficulties, it appears, says the *European Mail*, have been experienced in getting the necessary machinery to the fields. Now that it has arrived we should hear something shortly about the mines.

Mr. Edward Johnson, Honorary Secretary of the London Trade Marks Committee, has obtained an assurance from Mr. Salamons, Vice-President of the Executive Council of New South Wales, that if, on the arrival of the latter in the Colony to which he is now returning, he finds no steps have been taken in the direction of legislation similar to that accomplished in this country, he will himself bring the subject before his colleagues, with a view to an early settlement of the question. Australia was one of those countries to which Lord Herschell assured the House of Lords the Germans sent superior goods with a German mark, and inferior goods with a counterfeit English mark.

A copy of the resolution adopted at the conference of manufacturing jewellers and silversmiths, held at the Grand Hotel, Birmingham, on March 20, in favour of the abolition of the duties on gold and silver plate, having been forwarded to Mr. Bright, that gentleman has replied as follows:—"I shall be glad to support any reasonable plan for meeting your views. When I was a member of the Government some years ago an attempt was made to repeal the duties on gold and silver, but if I am not mistaken, those engaged in the trade would not accept the offer made to them, and nothing was done. I shall be glad if the present Chancellor of the Exchequer is more successful than the Chancellor of the time I speak of."

Mrs. Cleveland, the President's wife, is, according to the *American Press*, developing a "fad"—a costly one, perhaps—but one full of common sense. It is nothing less than the collection of diamonds, set and unset. Through the generosity of her husband, Mrs. Cleveland is already the happy possessor of a rare outfit of diamond ornaments. Her wedding gift, her birthday presents, and, indeed, on all occasions when Mr. Cleveland desired to give her a pleasant surprise the gifts have always been diamonds—necklace, rings in profusion—solitaire and otherwise—bracelets, pendants and brooches. The "fad" is practical. Presidential honours and salary come and go: stocks rise and fall; real estate may rise and fall, but the market value of a diamond is essentially the same always.

On the occasion last month of Sir Morell Mackenzie's Silver Wedding day, the Empress Victoria of Germany, has presented him with a costly basket of flowers ornamented with a bow of blue, yellow and red ribbons. The blue ribbon bears a portrait of the Empress surmounted by a Crown embroidered in gold, with a setting of small pearls, underneath being her Majesty's monogram worked in gold. In the yellow ribbon are worked sprigs of myrtle in green, silver and gold. The silver and gold designs are surrounded by facsimiles of Sir Morell's signature, and below appear the words—"April 11th, 1888, April 11th, 1913," significative of the donor's wish that Sir Morell and Lady Mackenzie may live to celebrate their golden wedding. The red ribbon bears the Emperor's portrait with the Crown and monogram.

Concurrently with the recent awakening of American watchmakers to the necessity for a more comprehensive education for workmen than is afforded by the factory system (as shown by the opening of the Indiana school for watchmakers, and other indications), comes an acknowledgment of the deficient training of American art designers, in the proposal of Mr. J. Ward Stimson, late superintendent of the Metropolitan Museum Art School, to establish in New York a school for instruction in practical industrial designing. In reference to which scheme the *Jewelers' Weekly* says: "The enterprise, if carried to a successful issue, will result in lasting benefit to our manufacturers. Nearly all the best designers in their employ are foreigners who have had the advantage of attending the excellent art schools of Europe. That such is the case is not to the honour of those who are chiefly concerned. A great industrial country like ours should not remain dependent upon foreign sources for its higher classes of artisans. The plan now proposed, if properly supported, will undoubtedly relieve our manufacturers of the expensive and troublesome necessity of importing the brains for their shops."

The Turners' Company's annual prize competition in turnery, will be held, by permission of the Lord Mayor, at the Mansion House in October next. The exhibition this year will be in diamonds, glass, stone, and pottery. In diamond cutting and polishing there will be four classes, and as a first prize a silver medal and the Freedom of the Company will be awarded. In glass the competition will be in respect of blowing, cutting, and engraving; in stone, any natural substance of a mineral character is included, such as porphyry, granite, jasper, agate, and marble; and the competition in pottery will include terra-cotta, stoneware, earthenware, and porcelain. The prizes will be numerous, and will include donations given by the Baroness and Mr. Burdett Coutts, Sir C. Hutton Gregory, and others. The judges will be the following—in diamonds: Mr. Burdett Coutts, M.P., Mr. John Jones, Professor Church, Mr. J. M. Hunt (Hunt and Roskell), and Mr. L. Keller; in pottery and glass: Mr. J. J. Holtzapffel, Major Copeland, Mr. W. J. Goode, and Mr. H. Powell; and in stone: Sir C. Hutton Gregory, Sir Douglas Fox, Mr. W. Brindley and Mr. G. Burt. Details as to the competition can be obtained from Mr. Edgar Sydney, of 4, Hare Court, Temple.

In the City of London Court, before Mr. Commissioner Kerr, last month, Mr. James Francis Kendal (trading as Kendal & Dent), watch manufacturer, of 106, Cheapside, E.C., brought an action against a Mr. Evans of Abergavenny, to recover the sum of £17 odd, balance of an account of £195 11s. 6d. The plaintiff's representative said that the plaintiff had watch clubs formed all over the country, and well-known tradesmen carried them on, receiving payment for so many watches sold. The defendant had for some months had watches sent to him and repairs executed to watches to the value of £195 11s. 6d., all of which he had accounted for except £17, for which he was sued. The defence was that defendant only acted as an agent, that the clubs were rather risky, and that the defendant had sent all the money he had received. The Commissioner, after eliciting that the defendant was paid by commission, decided in his favour, but said the plaintiff could have a jury if he wished.

Mr. Hanbury recently elicited from Sir J. Gorst, that according to the best information possessed by the Secretary of State, King Thebaw's revenue from the Ruby Mines did not average so much as £150,000, and he never received so much as £190,000. Stones of the value of 2,000 rupees were royal perquisites, but were generally secreted or broken up by the finders. As far as reports had reached the Secretary of State, the Indian Government had received only about 16,000 rupees during the preceding eight months. Whether a loss of current revenue was a permanent loss to the Indian exchequer could not be ascertained until the report of the scientific expert sent out had been received. He was at the mines now. All precautions that were practicable were taken, but some smuggling undoubtedly took place. The diminution of revenue between the royalties actually received and the terms offered by Messrs. Streeter took place while the mines were unworked, but as the rubies were still there it was expected to be recouped in years to come.

In the House of Commons on April 9, Mr. Watt asked the First Lord of the Treasury whether his attention had been called to the large find of gold in certain parts of Wales, the yield equalling, it was said, the best gold mines in the world; and whether the precious metals so found, or their equivalent value, were by law the property of the Crown under the Acts I Will. and Mary, s. 2, c. 30; 5 and 6 Will. and Mary, c. 6; and 55 George III., c. 134; and, if so, whether the Government were taking any, and if so, what steps to insure that the gold so found, or its equivalent value, was secured to the State in accordance with the provisions of the law. Mr. W. H. Smith in reply said:—Notice has been given by the Commissioners of Woods and Forests that mines Royal of gold and silver, wherever found, belong to the Crown and are not to be worked without authority from the Commissioners. The Commissioners are taking steps to insure that a fair equivalent for the gold found in Wales is secured for the Crown and the public.

The Chancellor of the Exchequer, questioned by Mr. Kenyon with respect to the rights of the Crown, said the Crown had an ancient prerogative right in all mines of this class, and this right was officially recognised in a famous case in the reign of Queen Elizabeth. The Crown had transferred some of these rights to the Colonial Governments, but he did not know whether any of those rights had been surrendered to the freeholders. Without consultation with the Government he could not agree to the appointment of a Commission to inquire into the whole question of Crown Rights and Royalties.

The Annual Dinner and Ball of the Swiss Society in London took place at the Freemasons' Tavern on the 13th ult., and was attended with its usual success, under the presidency of the Swiss Consul. According to the statement submitted to the members, the number of members on the roll is 153, the funded capital of the society is £5,200, and there is a cash balance in hand of over £73. While this flourishing state of affairs is very creditable to all its supporters, it is to be regretted that more of those members of the society who belong to it from purely patriotic motives, without any idea of personally benefitting from their membership, do not take an active part in its doings; and this regret, which is felt for other reasons by its active members, is largely shared in by us, who regard such institutions as the dinner and ball referred to as educational, in tending to remove the *mauvaise honte* and insular snobbishness too frequently to be observed in our home institutions of a similar character.

Another lot of precious stones has just arrived from South Australia, and have been pronounced to be rubies of an inferior quality. Jewellers have admitted that though the rubies already in this country are not of the orthodox colour, nevertheless their colour is likely to take the fancy of the jewel-buying public. Until some good commercial sales have been made, the brokers say that those interested in the sale of the stones must not build too much upon the judgment that the stones are rubies. In the meantime there is no doubt about it that the stones are being pushed in every direction among the trade. On this subject Mr. W. Streeter, of New Bond Street, writes to a financial contemporary as follows:—"I think you might, perhaps, like to know the result of my examination of the so-called 'Australian rubies.' Well, I have had several lots of these stones submitted to me for my opinion, and in every case I have had to pronounce them as only garnets—very much like those found in large quantities on the South African Diamond Fields."

The Diamond Market.—Little change in the market has been experienced during the past month. The *Amsterdam* demand for *Rough* is regulated, as might be expected, by the sale of finished goods, which just now is very limited.

The *Paris* trade is likewise but little improved; buyers looking out as before for bargains.

The *London* market is well stocked with current stuff at moderate prices, but the small demand for finished goods makes the buyers of *Rough* cautious, and trade is consequently extremely quiet.

Latest from *Kimberley* report market quiet, with no change in prices.

Silver.—Market quiet; Bars, 42½d. per oz.

Nickel Plating.—A new process of nickel plating has recently come into use in Belgium, by which a thick plating of nickel may be deposited on any metal by a feeble electric current in a very short space of time. The bath is composed of 10 parts sulphate of nickel, 7¼ of neutral tartrate of ammonia, 0·5 parts tannic acid and 20 parts of water. The sulphate of nickel is dissolved in 3 to 4 parts of water, carefully neutralised, the other ingredients added, and the solution boiled for a quarter of an hour; the rest of the water is added and the liquid filtered or decanted. By adding the materials in the same proportion, the strength of the bath may be kept constant. It is said that the deposit is brilliantly white, soft and homogeneous, and has, even when of great thickness, no tendency to scale.

# Trade Notes.

A CLOCK has been placed in the tower of St. James's Church, Devizes, by Mr. J. W. Benson, clockmaker to the Queen, Ludgate Hill. There is one dial, 5 feet in diameter, of stout sheet copper, and the hours are struck on a bell of 9 cwt., the quarters being chimed on two smaller bells.

On Easter Day a ring of nine new bells was dedicated at Fenton Parish Church, Staffordshire, the office being said by the Vicar, the Rev. H. C. Turner. The bells, which are the gift of Mrs. Hitchman, of Fenton House, have been provided by Messrs. Harrington & Co., Coventry.

Messrs. G. E. Walton & Co. (Limited), of 52, Hylton Street, Birmingham, have just brought out a useful little novelty, which will be retailed by all fancy dealers and jewellery ticket sellers. It consists of a leaf-turner for facilitating the turning over of leaves of music or manuscript. Two little ears, ready gummed for affixing, have a tuft of silk at one end, by means of which the leaves can be quickly turned without the usual danger of tearing the paper.

We have received from their designer some transfers of the badges of the Irish Teetotallers' Associations, upon which a run is expected during the forthcoming season. They consist of various articles of jewellery, such as pins, lockets, rings, earrings, watch keys, &c. having on each, as the prominent feature, a shamrock, with the words, "Irish Teetotallers' Association" engraved thereon. As we understand the movement is a somewhat extensive one, it might be worth the while of our manufacturers turning their attention in this direction.

There is on exhibition at the premises of Mr. J. Walker, jeweller, 77, Cornhill, a large diamond, which has been christened the Gor-do-Norr. The diamond belongs to the vendors of the Wadjra Karur Diamond Mine, for the purpose of purchasing which a company has been floated under the title of "The Madras Presidency Diamond Fields, Limited," with a capital of £190,000 in £5 shares. The stone in the rough weighed $67\frac{3}{8}$ carats, and has been cut into a magnificent brilliant of $24\frac{7}{16}$ carats. It is offered for sale at £15,000.

The recent revival, in a modified form, of the P.R., has at last come one length, and in the so-called "Pugilist Portrait Watches" of Mr. J. Vickers, of Chapel-st., Coventry, admirers of the "Noble Art" can be gratified by having a portrait of their favourite champion ever present on their watch dial. All the leading exponents are now on sale, and we understand the manufacturer is contemplating extending his idea to other branches of sport. Should public taste gravitate in this direction, a sporting watch may soon be considered incomplete without the accompanying portrait symbolical of the wearer's particular predilection.

A new turning pendant for the protection of watches from pickpockets, has just been introduced and patented by Messrs. Newsome & Co., of Coventry. The *modus operandi* usually in favour with gentlemen who follow the artistic profession of the late Augustus Tomlinson, is not as is generally supposed a violent tug at the watch chain, by which the latter is broken, and a precipitate retreat. As a matter of fact, however well the coat of the unsuspecting victim may be secured in a crush of any kind, the watch is gently drawn from the pocket, the pendant quietly twisted off, and the watch passed to some confederate. As a prevention against this kind of robbery the ordinary turning pendant affords good security; but for keyless watches the ordinary form is somewhat expensive. Messrs. Newsome's patent is, however, equally simple for either form of watch; in keyless watches it is fixed by a screw passing through the winding pinion, top of pendant, and bow, and in winding or setting the hands, the last turns with the button.

Messrs. B. H. Joseph & Co., Frederick Street, Birmingham, and Ely Place, Holborn, E.C., introduced to our notice a useful novelty for smokers in form of a lighter. It consists of two small tubes, one containing a plaited fuse, and the other a chemical substance in which is inserted a thin wire, on drawing which—charged with the chemicals—across the fuse it immediately becomes ignited. Its price, compactness and safety, will ensure a big demand for the novelty.

The gold casket in which Lord Hartington's Certificate of Freedom of the City, which was presented to him on the 18th ult., at the Guildhall, was enclosed, was designed and manufactured by Mr. George Kenning, of Little Britain. In the centre are the arms of the Cavendish family, with supporters and crests cut in rock crystal, and enamelled in the conventional heraldic colours. They are supported by oval medallions, in which are emblems representing the Marine and Postal Services, His Lordship having been First Lord of the Admiralty and Postmaster-General. On the lid is a naval coronet with a trident, flanked by sprigs of shamrock, in remembrance of his having been Chief Secretary for Ireland. The casket is surmounted by a figure of Britannia, with the Union Jack enamelled on an oval shield, seated on a bale of merchandise, representing "Commerce"; at her feet a lion couchant. At each end is the monogram of His Lordship enamelled in colours, the reverse of which has an oval medallion bearing an inscription. The casket is mounted on a marble plinth on which are enamelled the arms and supporters of the City of London.

Coventry Watch Trade Association.—This association is now in full working order. The officers are:—President, Lord Cheylesmore; Vice-Presidents, Messrs. W. Ballantine, J. S. Dugdale, M.P., P. A. Muntz, M.P., H. P. Cobb, M.P., George Woodcock, Alderman Gulson, and Colonel Eaton; the Secretary is Mr. J. S. Wilday. The association has been formed to supply—what has long been wanted in the local watch trade—an association by which the working members of the various branches could meet together and act in concert for their mutual interest. The circular convening the first meeting of the association stated that it had long been patent that the trade had suffered serious injury from evils which could have been stopped in the beginning if there had been a society to watch over the interests of the trade. Where individual attempts were powerless to remove an evil, an association representing a trade would be all-powerful, and would probably succeed in their first attempt. It was presumed that the present depressed state of the watch trade had brought the want of united action home to all minds. The committee therefore asked the members to urgently press upon all they knew in the trade the extreme necessity of joining the association, so that it might fairly claim to represent the whole of the various branches of the trade. In a discussion that was raised at the meeting as to the extent to which English manufacturers could use foreign material in their watches, Mr. T. B. Smith said there was a little uncertainty in the minds of many as to the reading of the latter part of clause 7. He thought that particular section was rather stringent, as it defined a watch to be every part except the case.—Mr. J. Walker said the wording of the Act in another part was that a manufacturer was liable if the watch was not English "in a material respect." That was the agreement between himself and Mr. Boyle, and the parts that were allowed to be foreign were the two springs and the chain. This provision was allowed because chains and springs were not made in sufficient quantities in England to meet the demand. It was contemplated, however, that those two industries—the manufacture of chains and springs—would be revived in this country, and then the Act would probably be altered. The words "material respect" were inserted merely to cover the two springs and the chain, and any manufacturer making up watches with anything else in them foreign would render himself liable to the penalties attached to an infringement of the Act.—Mr. Richards did not agree that that construction could be put upon the Act: but the Secretary said counsel's opinion agreed with that expressed by Mr. Walker.

# Birmingham News.

From Our Correspondent.

MANUFACTURING jewellers are still complaining about the falling off of business since the end of the first quarter; they were hoping for a continuance of the slight improvement which took place in the early part of the year, but it is evident that this quarter will be a poor one; a number of them are not working on Mondays, and with the commencement of the summer hours of the Factory Act regulations, most of them are working from 9 a.m. till 6 p.m., thus adopting the hours as far as closing goes, but not adopting the early morning *régime*, viz., 6.30 a.m. This is a method of working short time that has been very general of late years. I am unable to report any large lines being taken anywhere for jewellery. There appears to be no very special demand just now for any particular class of goods. Some of the coloured gold workers have a fair amount of orders, one of them just having booked an order for six dozen gold bracelets, ornamented with chaste designs in filigree work; this would find a considerable amount of hand-work for first-class workmen, but, generally speaking, the orders are few and far between; small jobs, such as coins mounted as brooches, earrings, &c., and general repairs, are keeping them going with a "hand to mouth" scale of business.

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There are some few orders booked for watches by the leading makers here, the English Watch Co. having obtained several good lines lately; and they report being nearly cleared out of stock, so that they have a prospect of full hours for some time to come. The more of this the merrier, we all of us think; and so no doubt do the shareholders, for these shares, among others, have been at rather a low price of late. A few lifts of this description would be some assistance in raising the quotations.

* * *

I have to report the approaching retirement of another manufacturing jeweller here—Mr. Richard Kent, of Hockley Street—like a number of other old-fashioned connections, the trade has gradually grown "smaller by degrees and beautifully less," until there is very little of the original left—and the sudden death of the eldest son, Mr. Reuben Kent, has been the last straw to "break the camel's back," Mr. Kent having decided to close the trade, as he is a good age. This will make the third extensive premises in Hockley Street that will be unoccupied—Messrs. Levi & Salaman having gone into Newhall Street, and Mr. Edward Scott into Vyse Street. By this means one side of Hockley Street has a decidedly deserted appearance, and is likely to continue so, for very few, if any, manufacturers are extending lately.

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Birmingham working-men evidently do not properly appreciate the sunny skies and other much-talked-of advantages of living in Spain, several of them, who were lately sent there to a branch establishment of one of the Birmingham houses, having returned, one after another, after an absence of a few months at most, although they were under terms of agreement for some three or four years, and were threatened with all kinds of penalties if they did not fulfil them. There is evidently something about the land of cigarettes, black-eyed damsels and cheap wines that does not agree with the Birmingham workman. One of them condescended to explain that "You could get nothing to drink in that beastly place." This is another tribute of affection that the working-man pays to his publican. Another could not exist without the Aston Villa football matches on Saturday: the bull fights did not compensate him, so he returns to his native soil, and I suppose will attend the next "Cup Tie" if he pawns his waistcoat to pay the entrance fee. Well, the British workman is an enigma. I almost wish that I was a poet, that I might dedicate a few lines to his most extraordinary taste and foresight. I have often heard an employer utter a few lines extempore upon the subject in a most expressive and forcible manner, and what was lacking in rhyme and metre was adequately compensated for by very strong adjectives. I am really afraid that I could not do anything better than that. I might destroy the sense for sake of the rhyme, so will leave the matter as it stands.

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By the kindness of one of our coloured gold workers, I have before me a very beautiful specimen of the art, consisting of a brooch in the form of a crescent, tastefully ornamented with filigree work, the centre filled in with a spray of leaves of a somewhat conventional type, supporting a letter set with pearls—the letter being the initial of the lady's name to whom it is to be presented. The whole forms a very beautiful ornament of a refined character.

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Another brooch is composed of the figures 1888, set with diamonds, intertwined with a "true lover's knot," in burnished gold. This is a very beautiful present for a bride, and will be a lasting *souvenir* of the happy event. A bracelet to match is in the form of a ribbon, tied together in the centre, in the same pattern knot, and supporting the letter K in diamonds—this being the lady's initial—and when on the wrist has the appearance of a golden ribbon tied round it—the bow or knot appearing to fasten the whole together, although, for the sake of convenience, it is closed in the ordinary way by means of a joint and snap.

# Sale of Mr. Andrews' Collection.

MR. ANDREWS' collection, which was sold last month by Messrs. Christie, Manson, and Woods, though not large, was a very choice one, containing several fine pieces by such famous masters as Fra Xanto and Maestro Giorgio, which brought high prices. A partly fluted Caffaggiolo dish, painted with a portrait of a lady, 11in. in diameter, £73 10s.—Innes. A circular Urbino dish, with Hercules detecting Cacus seizing his cattle, signed Fra Xanto A. da Rovigo i Urbino, and dated 1532, from the Fau collection, £89 5s.—Innes. A fine Urbino Tazza with Cephalus and Procris, gold and ruby lustre, 11¼ inches diameter, signed Fra Xanto A. Rovigiese i Urbino, from the Fountaine collection, £241—Stettiner. A circular Tazza, painted with the Last Supper, by Nicolo da Urbino, 11in. diameter, from the Fountaine collection, £105—Innes. A fine Urbino dish, with the rape of Helen, composition of about forty figures and ships on the seashore, by Nicolo da Urbino, 20in. diameter, after a print by Marc Antonio, £262 10s.—Innes. A Gubbio Tazza, painted with a draped female figure, gold and ruby lustre, by Maestro Cencio, 10½in. diameter, £76 13s.—Lowengard. A round Gubbio dish, with sunk centre, in colours gold and ruby lustre, by Maestro Giorgio, 10¾in. diameter, £126—Lowengard. A Pesaro dish, with female allegorical figure in gold and ruby lustre, 16in. diameter £96—Seligmann. A fine Byzantine enamel chasse, blue ground, with the Apostles under an arcade at the sides, the Crucifixion and Resurrection at the ends, bosses of metal gilt, 11th century, from the De Bruge Collection (No. 662), £420—Philpot. Chinese porcelain. A coral-coloured, pear-shaped, bottle (Ming period). 7in. high, £147—Fraser. A tall jar, of red cracklé (Ming period), 17in. high, £79 16s.—Fraser. A globular bottle, of mottled sang-de-bœuf, 16in. high, on wood stand, £84—Fraser. There was also some good old English furniture, of which a large Sheraton cabinet sold for £113 8s.—Philpot. A mahogany Sheraton writing table, £89 5s.—Philpot. A fine Sheraton sideboard, mahogany and satinwood, inlaid with classical female figures, and surmounted by large vases, £79 16s.—Tooth. Set of six mahogany Chippendale chairs, and two armchairs, *en suite*, with open work shield backs, carved with wheat ears, &c.—£50 8s.—Philpot. Old Italian bronzes. A group of Hercules and Lichas, £94 10s.—Stettiner. A group of the Madonna and infant Christ and St. Elizabeth, inscription, "Guido Nolfins I.V.D., Anno Jubilei 1600, Fieri fecit," £105—Lowengard. The whole collection realised £5,742 17s. 6d.

## Paris Universal Exhibition, 1889.

AN Executive Council, of which the Lord Mayor of London is Chairman, has, with the consent of the Government, been formed to superintend the arrangements of the British Section.

The recently issued prospectus points out the advantages which must necessarily accrue to British firms from being represented by a Council whose functions would be fully recognised by the French authorities. Those who have taken part in foreign Exhibitions in the past, know well the importance of this safeguard to their interest, in respect to facilities of transport, installation, due representation before the juries, and other matters—facilities which individual firms would, perhaps, have great difficulty in acquiring. Moreover, by the combined action of Exhibitors, through the medium of a Committee, it is alone possible to make a uniform and consistent representation worthy of this country.

Inasmuch as the British Government have decided not to provide funds in aid of the Section, it is necessary that Exhibitors should make a payment in proportion to the space which they occupy, in order to cover the charges for completing, fitting up and decorating the Courts, for general maintenance and guardianship, and for the other necessary expenses of the Section. For, although the French authorities make no actual charge for space, they require that much of the work in preparing the galleries should be done by the Exhibitors, or their representitives —the Executive Council of their Section. Although the buildings are provided, they are provided in a very incomplete condition. They have no floors, except in the gangways, and they are entirely undecorated. In addition to this, there would be the cost of the necessary staff, and all the various incidental expenses connected with the working of a somewhat elaborate organisation.

The Council have reduced these charges to the lowest possible amount consistent with a due regard for the proper representation of the manufacturing interests of the country, viz., 5s. per square foot. It is their intention that the utmost economy shall be exercised, and the strictest supervision will therefore be enforced over all the outgoings. But at the same time they are determined that the contributions of this country shall be shown in a manner worthy of the occasion, and of the reputation which Great Britain has gained in former International Exhibitions. If there should be any surplus after the close of the Exhibition, it will be disposed of in accordance with the decision which may be arrived at by a meeting of Exhibitors and Guarantors called for the purpose.

As the object of the Council will be to ensure a collective Exhibition of the very highest class, it will be their aim to secure the assistance of manufacturers and others who can most worthily represent the country, and not merely to fill up all the available space. They will be glad to hear from firms of high standing who intend to exhibit, and to give them all the information in their power, if they will apply at the offices of the British Section, No. 2, Walbrook (Mansion House), E.C. Applications were to have been sent in not later than the 28th of April, 1888. This date has since been extended, but only on the understanding that intending Exhibitors, applying subsequently, must take their chance of the available space being filled up.

Arrangements have been made with the French Railway Companies, and with the *Compagnie Générale Transatlantique*, and the *Compagnie des Messageries Maritimes*, whereby all products destined for the Exhibition (except objects of art, precious materials, and animals), will benefit by a reduction of 50 per cent. on the ordinary tariffs. Arrangements of a similar nature are also being made with the English Railway Companies. The Exhibition will, as has previously been the custom, be a Bonded Warehouse, and exhibits will be exempt, from Customs' charges.

The Exhibition will be opened on May 1st, 1889, and will close on the 31st of October following. No objects will be admitted after the 1st of April. Group III, Classes 23 and 24 include Cutlery, and Goldsmiths' and Silversmiths' work, and Class 26 Clocks and Watches. Jewellery and Bijouterie is in Class 37, Group IV.

## Pawnbrokers and the Merchandise Marks Act.

AT a meeting of the Liverpool and District Pawnbrokers' Association last month, the Hon. Sec. read the case which was selected as a test case with respect to the above named Act, as drawn up by the Solicitors to the Association, together with the Counsel's opinion on the subject. As the opinion is in many respects general, it will be of interest to most of our readers. We commend it to the attention of the London Watchmakers' Association. The case and opinion which we take from the *Pawnbrokers' Gazette* are as follow:—

"THE MERCHANDISE MARKS ACT, 1887.

"CASE FOR THE OPINION OF COUNSEL.

"In a case which recently came before the Stipendiary Magistrate at Liverpool, a question of considerable moment to Pawnbrokers under the provisions of the new Merchandise Marks Act, 50 and 51 Vic., cap. 28, arose. The facts of the case were as follows:—

"One Robert Chapman (the prisoner) on the 23rd February, 1887, purchased at a sale by auction in Ancoats Street, Manchester, a gold centre seconds watch for the sum of £12. There was no name of the manufacturers on the plate, but simply on the case the letters 'S. & B.', the marks of a firm of watch case makers. Chapman appears to have found out that this firm made the watch cases for Messrs. M. & J. Hargreaves, watch manufacturers, Liverpool, and in consequence took the watch to an engraver and got him to engrave Messrs. Hargreaves' name upon the plate, where the name of a watch manufacturer is generally put. When this was done Chapman pledged it for £12. The watch was forfeited and sold by auction, and in the sale catalogue the watch was described as being of Messrs. Hargreaves' make. The watch was subsequently taken to Messrs. Hargreaves, who immediately said it was not of their manufacture. Chapman was committed for trial and subsequently pleaded guilty at the assizes and was fined £15. The practice in sales by auction of forfeited pledges is to describe the articles generally as being from the stock of Messrs. A. B., of C. D., Pawnbrokers, then for the purpose of subsequent identification, if the pledger should exercise his statutable right to inspect the sale catalogue and Pawnbroker's books, to specifically name the article, giving the name of the manufacturer, and if it be a watch, the name which may appear on the case as the maker. By the 2nd section of the Merchandise Act, 1887, it is enacted that every person who sells, or exposes for, or has in his possession for sale, or any purposes of trade or manufacture any goods or things to which any forged trade marks or false description is applied, and by the 3rd section of section 3 of the same Act the provisions of the Act respecting the application of a false trade description to goods, or respecting goods to which a false trade description is applied, extends to the application to goods of any false name or initials of a person applied in like manner as if such name or initials were a trade description—shall, unless he proves (*a*) That having taken all reasonable precautions against committing an offence against the Act, he had at the time of the commission of the alleged offence no reason to suspect the genuineness of the trade mark or trade description and (*b*) That on demand made by or on behalf of the prosecution he gave all the information in his power with respect to the persons from whom he obtained such goods or things or (*c*) That otherwise he had acted innocently or guilty of an offence against that Act.

"The provisions of the Act include a sale, and consequently a sale by auction as is customary by Pawnbrokers, would it is assumed be within the Act. Does a Pawnbroker therefore become liable under the provisions of the Act to the penalties of the Act, if it should turn out afterwards that the trade mark initials or name of a manufacturer of any article should have been forged or applied to such article prior to the pledging? If counsel answers this in the affirmative, would he think it advisable for a Pawnbroker to rely upon being able satisfactorily to comply with the requirements A and B of Section 2, of the Act, or should not the pledger at the time of pledging be required to sign a warranty that the article was of the manufacture of the person whose name, initials, or trade mark it bore? (A mortgagor of property enters into absolute covenants of title with the mortgagee, and therefore why not a pawner with the pawnee), or should special provision be made in the particulars that the article purports to bear the trade mark initials, or name of A. B. of C. D., &c.?

"Counsel will please advise, and also what general precautions should be taken by Pawnbrokers on sales of forfeited articles, so as to prevent successful proceedings under the Act being taken against them, and if he does not think that the foregoing questions sufficiently raise all the points affecting Pawnbrokers under the Act, will please advise—and generally.

OPINION.

"The Pawnbroker commits an offence under sec. 2 sub-sec. 2 by having falsely marked goods in his possession for any purpose of trade, even without sale, unless he can prove the excuses mentioned in A. B. and C. His precautions therefore must be taken before he received the marked article into his possession. It is impossible to define what 'all reasonable precautions' might embrace. They might vary according to the circumstances of each case, for instance, the age, appearance, known

or unknown antecedents of the pawner, the questions put to him, and the age and intelligence of the person employed. To put them see the Pawnbrokers' Act. 1872, 35 and 36 Vict., cap. 93, s.s. 32 & 34. I think the taking the warranty would in most instances be no protection to the Pawnbroker. Its only bearing on the question would be as evidencing an intention to take all reasonable precautions, and its operation would be, not in giving the Pawnbroker a remedy against the pawner, but of showing *bona fides* on the part of the latter, which would be an element in determining the Pawnbroker to accept the pledge. It is evident that in the case of many, if not most customers of Pawnbrokers of signing a warranty, would be a very slight indication of *bona fides* and for any other purpose would be worthless. A statement in the auction particulars, whereby the Pawnbroker guarded himself from vouching the genuineness of the mark would be quite ineffectual to avoid an offence, which is committed under the Act by the mere fact of possession or sale of an article falsely marked, in fact whether the Pawnbroker makes or disclaims any warranty that the mark is genuine. It might of course be a protection as between him and the buyer, which is a totally different matter, but so far as the Pawnbrokers' position under the Act, it might rather tell against him, than for him, as it might be thought to indicate a doubt on his part whether the mark was genuine.

"He can only protect himself by taking every precaution which common sense would suggest in each particular case.

"R. Henn Collins.

"4, Brick Court Temple, *March 24th*, 1888."

## New Company.

Manoah Rhodes and Sons, Limited.—On the 5th ult., this Company was registered, with a capital of £25,000, in £10 shares, to acquire the business, goodwill, stock-in-trade, plant, fixtures and effects of, and now belonging to, the firm of Manoah Rhodes and Sons, of Bradford, in the county of York, jewellers, watchmakers and silversmiths. The first subscribers are:—

*T. A. Rhodes, Bradford, jeweller, one share; W. Boyes, Bradford, jeweller, one share; *R. N. Rhodes, Bradford, solicitor, one share; C. G. Lee, 73, Rodney Street, Liverpool, one share; Ann Watson Lee, 73, Rodney Street, Liverpool, one share; *E. R. Owen, Holmwood, Blackheath, Kent, one share; P. C. Owen, Holmwood, Blackheath, Kent, one share:

The number of directors is to be three, and the first are the subscribers denoted by an asterisk. Thomas Ackroyd Rhodes is appointed managing director at a salary of £400 per annum. The future remuneration of the other directors shall be determined by the company in general meeting.

The Hatton Garden Jewel Robbery.—At the Central Criminal Court on the 27th ult., before the Recorder, Henry Norris, *alias* Beauchamp, 60, pleaded guilty to two indictments, one charging him with stealing a large quantity of jewellery, value £700, the property of a jeweller named Thompson, and he also pleaded guilty to a charge of endeavouring to induce a Post-office official to betray his trust.—The Prisoner appeared to have had a most extraordinary career. In 1849 he was in the employ of the Post-office, but he misconducted himself and was convicted and sentenced to imprisonment. He subsequently appeared to have become guilty of various other offences in Paris and Brussels, and he then appeared to have come to England, and was convicted of various offences and sentenced upon two occasions to penal servitude. He was afterwards convicted of uttering a forged Bank of England note, at the Croydon Assizes, and was again sentenced to penal servitude. After this he was suspected of being concerned in a daring robbery of jewellery that was committed a few years ago in Hatton Garden, but he contrived to elude detection. He subsequently endeavoured to induce a Post-office official to steal a large quantity of money order instructions. With regard to the present charge of stealing jewellery it appeared that he had gone to the shop of the Prosecutor, who carries on business in Westbourne Grove, and represented himself to be Captain Beauchamp, and said that he required certain articles of jewellery for the purpose of making wedding presents, and jewellery amounting to the value of £710 was forwarded to an address given by the Prisoner. He contrived dexterously to substitute a dummy parcel for the parcel of jewellery, and made off with his booty, none of which had been recovered.—The Prisoner was sentenced to ten years' penal servitude.

## The Trade Marks Act.

THE case of Robert Chapman, who was in March last fined £15 by Mr. Justice Grantham for falsely marking a gold watch with the name of Messrs. J. Hargreaves, watchmakers, of 17, Norton Street, Liverpool, may be expected, says the *Liverpool Courier*, to serve the very useful purpose of educating in the legal aspects of such enterprises persons who are not swayed by moral considerations. The story related by Steele in the *Spectator* about the respective trading systems of Honestas and Fortunatus is true of many people of the present day. While some trade on the principle of giving fair value, and dealing in the genuine rather than the pretended, while being contented with the modest profit accruing to honest trade, others act on the principle of subordinating everything else to the one consideration of "piling up the almighty dollar" of American colloquialism. Hence the frequent resort to dishonest practices, which, as Mr. Justice Grantham puts it, are viewed only as "sharpness in trade," though it is the same kind of sharpness that inspired the traditional Yankee pedlar to vend wooden nutmegs. The learned judge inclines to the opinion that if some large manufacturers were brought to the bar of justice their production and sale of counterfeit goods would secure them conviction for "obtaining money under false pretences," which is a more ominous phrase than "sharpness in trade." The sort of business 'cuteness which enables people to obtain a mean advantage over their fellows is not at all a commendable trait, when considered from either the moral, legal, or social standpoint, but it must not be confounded with that business aptitude which enables a man to recognise varying public requirements and so conduct his trading enterprise that he can obtain the fullest share of popular patronage. In short, the good business man is not necessarily dishonest, though some who pose in this character when detected in some "sharpness in trade" readily urge the plea, "business, you know," as if the demoralising practice were an essential of trade. Judge Grantham believes that it will generally be found that "honesty is the best policy," though this old adage has always been held in disrepute among those who pride themselves on their "sharpness in trade." It is this sharpness that caused grocers to mingle sand with the sugar in the days when the product of the saccharine cane was much dearer than now, and that induced them to make their tea weigh more with the help of iron filings, and that has impelled dealers in more modern days to mix ground olive stones with their pepper, to serve the public with pretended butter for the real article, and to eke out the resources of the dairy with the liquid obtained from the cow with the iron tail; while textile manufacturers have invoked the aid of science to produce a cloth of commerce with plenty of weight but little cotton: and hardware manufacturers have humoured the requirements of trade by fraudulently marking their wares to suit customers. The "foreign competitor" has taken the fullest advantage of the promptings of "sharpness in trade," and provided the world with watches and other articles purporting to be of British manufacture. It was the action of the foreigner in presuming to be thus "sharp" that impelled the British Legislature to adopt the protective measures of the Trade Marks Act of last session, as the result of the "great sensation" to which Mr. Justice Grantham referred.

Chapman's case was not a bad one, considering the extent of general trade demoralisation. He purchased for £12 a gold centre-fingered watch, which he at first believed to be the manufacture of Messrs. J. & J. Hargreaves, of this city, and he had their name engraved on it; but when he offered it in pledge Mr. Pryor discovered its counterfeit character, though he offered to lend £11 on it. Subsequently, after learning that the watch was not a Hargreaves, the defendent pawned it as one, and gradually it got round to the successors of the firm whose name had been improperly used. Hence the prosecution, which was under the act of 1862 and not under that of last year. Of course there could be no defence to Chapman's conduct, which was wrong from first to last. It it is clear that whatever he may have imagined about the watch even in the first case, he had no

right whatever to inscribe any makers' names on it. Such names are trade-marks, and materially affect the selling value. Chapman had J. & J. Hargreaves engraved on the watch in the hope that he would thereby be able to sell it to better advantage than would otherwise be possible ; and even though he might have believed it was really a Hargreaves, he had no moral or legal right to put the name of that firm on it. His subsequent conduct in pawning a watch which he knew to be counterfeit was still more reprehensible. Still, on the whole, we concur in the Judge's view that the requirements of the case are met by fine instead of imprisonment, especially as it seems to be understood that the prosecutors will be compensated for the expenses to which they have been put. But it should not go forth that all offenders will be similarly treated. Manufacturers or traders who place on their wares "fictitious names and marks" must be taught that such action is fraud, and not "sharpness in trade," and that for offences of this kind prison discipline is quite as well earned as in cases of direct larceny. Chapman is the first to come within the law under the new "sensation," and it may be hoped that the heavy money penalty to which he has been subjected will warn others who may be similarly disposed to appropriate other people's names or trade marks to give a fictitious value to their goods.

## The Navy's Gift to the Queen.

IT was decided in the early part of last year by a Committee of Officers of the Royal Navy and Royal Marines to obtain from members of the service subscriptions wherewith to purchase an appropriate Jubilee gift for the Queen. A general meeting was held, and after some discussion it was determined that the gift should take the form of two silver models—one of a warship typical of the best three-deckers of the early part of the present reign, the other of a modern ironclad of the most recent pattern. The "Britannia," a 120-gun ship, which was launched at Plymouth in 1820, was selected as the original for the former ; the "Victoria," a turret ironclad ram, which was floated out of dock at Elswick in the Jubilee year, was taken as the original for the latter. A volume containing elaborate water-colour drawings, plans, and descriptions of the two ships was presented to the Queen, at Osborne, on July 22 last ; Messrs. Hodd & Son, of Hatton Garden, the firm to whom the construction of the models was entrusted, were able to exhibit them to a large number of naval and marine officers at the rooms of the Royal United Service Institution. The "Britannia" was a ship of 4,672 tons displacement ; the "Victoria" is one of 10,470. The "Britannia" was dependent upon sail-power alone, and spread 12,600 yards of canvas to the breeze ; the "Victoria" has no sails at all, but, on the other hand, has twin-screws and engines of 12,000 indicated horse-power, not to mention nearly sixty subsidiary engines of various kinds. Equally different are the two vessels in the matter of armament. The "Britannia" carried 120 guns, but her biggest gun weighed only 56 cwt., whereas the "Victoria" carries only 15 heavy guns, though her two heaviest weigh 111 tons apiece, and between them throw a far weightier volume of projectiles than was thrown by the entire broadside of the older ship. The models which were lately shown, will, when completed, be in every outward respect accurate reproductions of these two representative vessels. They are on a scale of one-tenth of an inch to the foot, and are therefore 1-120th of the size of their originals. What this reduction means may be judged from the fact that the anchor of the "Britannia," which weighed 110 cwt., now weighs only a quarter of a troy ounce. Nevertheless every detail has been faithfully represented, including even the eyebolts and planking of the boats that are to hang upon her davits. Her masts, bowsprit, and yards are built up of over 370 pieces ; her rigging contains about 1,000 feet of wire, and the whole model comprises nearly 4,000 separate pieces of silver. Yet, including bowsprit and spanker-boom, the ship is only 31½ inches long and 20 inches high. The "Victoria," which is a less picturesque but not less faithful model, is 34 inches long. Her eight Nordenfelt guns, carriages and all, can all be placed upon a florin and weigh under half-an-ounce ; yet they are made up of 118 separate pieces. The whole ship includes about 3,000 separate pieces, and to fit together the two ships, about 5,000 solderings have been made, and some 7,000 holes bored, the smallest holes not being more than 1-150th of an inch in diameter. About 600 ounces of silver have been used. Each model stands on a corrugated plate of greenish silver-backed glass, surrounded by a black moulding, and is covered with a plate-glass case. The workmanship is marvellously fine ; indeed, it has been said by competent judges that no equally beautiful work of the kind has ever before been produced. The two models will, it is hoped, be ready for delivery to the Queen in about a month.

Suicide of Mr. Henry Rossiter Robbins.—On April, 13th, the Coroner for Central Middlesex, Dr. Danford Thomas, held an inquiry as to the death of Mr. Henry Rossiter Robbins, aged 40 years, an American gentleman residing at 54, Torrington Square, who had committed suicide by shooting himself the morning of the previous Tuesday last. Mr. Alfred Bedford, Manager of the American Waltham Watch Company, said deceased was connected with the firm, but was not in good health, and was of excessively nervous temperament. Some four years ago he met with an accident by being thrown out of a carriage in New York, and having injured his head had never been well since, and was much depressed. He was at business on Monday, and seemed more depressed than usual. On the following morning he was informed that deceased had shot himself with a revolver. He had never threatened his life, but had frequently wished himself dead. Mr. Frederick Haywood, of 54, Torrington Square, deposed that deceased had occupied apartments there about four months, and suffered from great depression of spirits. On Monday evening he returned home, and had his dinner, and then retired to his bedroom. About half-past four on Tuesday morning he heard a report like that of fire-arms, but thinking it came from the mews took no notice of it. At breakfast time, as deceased did not make his appearance as usual, he went up to his bedroom, and finding the door locked, his suspicions were aroused, and on the door being forced open, the deceased was then found lying on the floor in a pool of blood quite dead, and a revolver by his side. Dr. Badcock, of Gower Street, who was called in, said he had attended deceased for indigestion, and saw him the previous day, when he was much depressed and thought he was worse. When called in on Tuesday morning, he found him dead with a wound in his forehead. A revolver was under him, one barrel of which had been discharged. The wound was the cause of death. He understood deceased was in the habit of taking chloral to produce sleep. Further evidence was given as to deceased complaining of want of sleep, and to his taking chloral to produce it. The jury returned a verdict of suicide whilst in an unsound state of mind.

Messrs. George Edward & Sons, jewellers, of No. 1, Poultry, and Glasgow, have received a commission to prepare the casket to contain the address to be presented by the Magistrates and Town Council of Glasgow to the Prince and Princess of Wales on the occasion of their visit to the city to open the International Exhibition. The casket, which has been specially designed by Mr. George Edward, jun., is in silver gilt. It is oblong in form, the ornamentation being of classical character. Surmounting the lid is a statuette of Their Royal Highnesses in silver work. On the front panel is a view of the International Exhibition ; and on the back panel a reproduction of Frith's picture of the marriage of the Prince and Princess. The end panels contain representations of the Glasgow Cathedral and the University, the new Municipal Buildings, and the Glasgow Bridge. At the corners are Corinthian columns surmounted by the lion and unicorn, the supporters of the royal arms, while at the base are symbolical representations of science, art and industry. The Prince of Wales's feathers and the Glasgow arms are embraced in the ornamentation, and altogether the design is eminently handsome and appropriate.

## A New Astronomical Clock.

AT the recent Mechanics' Fair in Boston there was on exhibition an astronomical clock designed for the Conant Astronomical Observatory by Mr. H. Conant, whose life has been identified with the cotton manufacture as a successful inventor and treasurer of one of the large thread mills bearing his name in Rhode Island. The clock is provided with two pendulums and three dials one of which shows and indicates the mean solar time, another the sidereal time, and the third one indicates the right ascension of the mean sun. The sidereal time gains on the solar time 3min. 56sec. per day and has a daily progress of that amount. Now at the time of the vernal equinox, on Mareh 21, the hands of the large dial point to zero, A supplementary hand shows the approximate position of the sun, and the large dial is marked with an eccentrie circle representing the ecliptic, with the radiating lines showing the hours in right ascension and concentric circles indicating lines in declination, ten degrees apart. One of the principal features in this clock consists in the mechanical devices employed to connect two movements to the third dial so as to indicate the differencc between the solar and the sidereal time. This is done by motion communicated to a pair of bevelled wheels revolving in opposite directions, cach one being moved at the normal rate of the clock driving it. The gear wheel connccting the two receives a differential motion, because, if the speed of the two driving gear wheels were uniform, there would be no orbital motion to this wheel, but it would revolve on its own axis in a stationary position. But, according to the measure by which the velocity of either of the two driving wheels exceeds the other, an orbital motion is produced on this intermediate wheel, and this orbital motion is applied to the main shaft of the right ascension dial.

## On Diamonds.

By George F. Kunz.

DIAMONDS are daily becoming more popular. Although they are not worn so promiscuously on all occasions as they were a few years ago, our import lists prove conclusively that the peerless gem still holds the first place in pnblic estimation. Twenty years ago 25,000 dols. was an unusual amount for even the wealthiest families to have invested in diamonds. Ten years ago some few had diamonds to the value of a quarter of a million, but to-day there is more than one family that holds over half a million dollars' worth of this gem—over one-third the value of all the jewels of the recent crown jewel sale. Earrings worth from 5,000 to 8,000 dols. per pair exeite no wonder now. Formerly they were seldom seen. It is computed that one-third of the jewels sold at the reeent crown jewel sale at Paris came to this country, and three diamonds arc now owned in the United States which weigh $55\frac{1}{4}$, 77 and $125\frac{3}{8}$ carats respectively.

Diamond buyers are becoming more nmmerous every dav, and as each is obliged to rely largely upon his own judgment in purehasing, a few practical suggestions may prove helpful to many, especially since the abandonment of the old method (which was in vogue for 100 years) of obtaining the weight of a stone. It was to square the weight of the stone and then multiply by the value of a one-carat stone of the same quality. That is, if one carat were worth 100 dols., a two-carat stone was worth 2x2x100—400 dols., or a four-carat stone, 4x4x100 equal to 1,600 dols.

The discovery of the South African mines in 1867, the opening within a short time afterward of 3,143 claims, all within the radius of a mile and a half, the Kimberly and De Beers mines having recently consolidated into one company, there are in all less than fifty companies which are rapidly being unified into one gigantic corporation, which will regulate the diamond supply of the whole world, throw on the market more diamonds than had been found throughout the whole world during the two centuries before, 87,000,000 carats (over seven tons of diamonds), valued in the rough at 250,000,000 dols., and after cutting, at 500,000,000 dols., have been taken from these mines. The estimated value of the world's entire stock of diamonds is 1,000,000,000 dols.

The American public are the most critical judges of diamonds and hence buy the largest percentage of fine diamonds. Russia, Mexico and the Spanish speaking countries buy the yellow and those of second quality. Paris and New York receive the best assortment of brilliants and perfectly matched pairs.

The term "first water" is varied in meaning according to the class of goods carried by the dealer using it. It is now, however, intended to refer to a diamond that is absolutely free from all trace of colour, blemish, flaws or other imperfections, and whose brilliancy is perfect. It is almost impossible to value a diamond by its weight. Colour, brilliancy, cutting and the general charaeter and perfection of the stone are all to be taken into account. Of two stones, both flawless and of the same weight, one may be worth 600 dols. and the other 12,000 dols. Exceptional stones often bring fancy prices, whercas off-coloured stones sell for from 60 to 100 dols. a carat, regardless of size. The poorer qualities have depreeiated so much that some are worth only one-tenth to one-quarter of what they were twenty years ago. This is especially true of large stones of the second or third quality. As an instance of the depreciation of coloured stones we remember the famous Dewey diamond, found near Manehester, Va., in 1856, on which the late John Morrissey loaned 6,000 dols. This stone weighed eleven carats after cutting, but it would scarcely bring as many hundreds to-day, except for associations.

To be really fine, a diamond should be cut neither too deep nor too shallow (spread, as it is termed), but should be mathematically perfect in its proportions. A dealer usually buys either a deep or a spread stone for as much less than the price of the perfect stone which can be cut from it, as will pay the expenses and the risk of re-cutting. For example, a three-carat spread or deep stone may furnish only a two-and-a-quarter-carat stone of perfect shape, and is therefore worth the price of the latter, less the risk and cost of re-cutting, and not as much, or more than a three-carat, simply because it spreads over more surface. Very often Brazilian gems, the very finest as regards purity, and brilliancy and perfection of cutting, yet containing some almost microscopic earbonaceous fragment or some slight flaw, may be rejected by a person who wishes absolute perfection; but this same person may select a stone, that, though perfect in every way, lacks that essential feature of a fine diamond, brilliancy, and is almost lustreless when eompared with the stone that he had rejected.

There are as many different qualities in diamonds as in horses. Diamonds may be round, oval-oblong, rounded squares or square; the cuttings may be mathematically correct, fine, fair, or poor. A diamond may be of the proper depth, or it may be too deep; it may be shallow or spread; it may be perfect; it may be slightly flawed, contain black spots, be brilliant or medium brilliant. Its colour may be pure white, milky, steel blue, or it may be off colour, tinted, or bye-water; in fact there can be many hundreds of differences in a one-carat stone.

As Jefferies, the diamond dealer and authority, said in 1750, the fine diamond should be as clear as pure rock water, perfect in shape, and not only pure white, but lively, showing fire, as it is called. Any undecided tint of brown, yellow, grey, or other colour, is a positive blemish. But when the tint is deeided, as blue, pink or green, in which case the colours are called "fancy," they are held in high estimation.

Persons who wish to part with diamonds which they have held for some years, almost always return to the party from whom they originally bought them. They are not infrequently surprised to find that the dealer has enough of that certain grade or size in his possession and for the time being is not a purehaser. As a recent instance of this, a fancier had purchased a number of the

largest and most expensive diamonds in America, giving special orders for them. The price paid was therefore necessarily higher than if the purchase had not been forced. When he wished to part with them he thought the dealer should buy back all the gems. But no one would expect the decorator, or the dealer in furniture, carpets, rugs, pictures, or other luxuries, to take back a single object. The dealer in diamonds is expected to do so, because diamonds are generally considered as good as cash.

But in many cases the mounting of a diamond and other precious stones is a considerable item in the cost price, especially when the stones themselves are of small value. In buying back such a mounting, jewellers always take into account the cost of the workmanship, and hence, many are disappointed when they receive for a piece of jewellery on parting with it, only one-third or one-fifth of its original cost.

Between the diamond dealer and the general public, great confidence is required, for there are very few of the laity who can distinguish those little differences of colour which make or mar the diamond. Long experience and years are required to pick out a diamond, flawless in every respect, yet almost any intelligent person can select a fine diamond when he can feel assured that all the stones he is examining are of good quality. It is astonishing how by such superficial comparison, slight differences can be detected by a person of good eyesight, who never examined a diamond before. On the other hand, though it seems strange to most readers, it would be possible for an educated man, a good general observer, but without knowledge of diamonds, to enter an establishment and examine at different times say 500,000 dols. worth of diamonds, and then, after selecting the stone that he thought the best cut and purest in the lot, to find on making comparisons elsewhere that the stone was not what he thought it was; that it was of the second or third class, and the mounting very inferior. In short, he had evidently dealt with the man who made it his aim to suit those who above all things wish to buy cheap, and consequently purchase, as a rule, only off-coloured, ill-shaped and imperfect stones, mounted by a jeweller who uses a profusion of low grade gold, and who, to judge by his workmanship, would have succeeded better in some less artistic profession.

Suppose a lady wears diamonds whose average value is from 75 dols. to 125 dols. per carat, and another, those costing from 300 dols. to 500 dols. per carat. Let both those lots of diamonds after they have given their social assistance—for the jeweller assists no social selection quite as much as the clothier—be placed in open market for sale. The experience of the last few years shows that the former purchaser will lose a large percentage on the cost price of her diamonds, while the latter will almost reimburse herself, and that a ten-dollar diamond can be as white and as perfect as a 1,000 dols. stone, may seem strange to many.

That fine diamonds hold their value well, the recent sale of the French crown jewels prove. Three of the Mazarins were appraised for inventory a century ago, and it is reasonable to suppose that the estimates given at that time were at least high enough. The figures of the appraisal and of the sale were as follows:

| Weight. | Appraisal. | Price realised. |
|---|---|---|
| 28 6-16 carats. | 250,000 francs. | 155,000 francs. |
| 24 27-32 ,, | 200,000 ,, | 121,000 ,, |
| 22¼ ,, | 160,000 ,, | 81,000 ,, |

These three stones were bought by a firm to be sold at a profit. This is more, perhaps, than any other three objects that were then inventoried would bring to-day. In this case the original valuation was not what was paid for the stones, but what they hoped to obtain for them in the event of a sale.

In the case of war or of social disturbances, such as have suddenly convulsed European communities in times past, diamonds would be of more value than any securities, for the stones could be sold in any civilised country and would be like so many coupons finding ready purchasers when real coupons or bonds might go a-begging. How often are securities worth no more than the first few coupons? In the case of our necklace every coupon would count. Many sureties have fallen more within a few years, as during our civil war, with gold at 285½, a million dollars' worth of diamonds could be carried in a hand satchel, or even the vest pocket without arousing suspicion. A 50,000 dols. diamond necklace weighs less than three ounces and can be put into the vest pocket, or worn as an armlet or a garter, weighing less than an average watch.

If a man buys or builds a fine house, and derives therefrom a certain amount of profit or enjoyment, he does not in all cases find that he can realise his original investment. A fine span of horses may for a time hold their value, but if the owner in parting with them does not realise the full amount of the original purchase money, he does not feel imposed upon. The amount realised from the sale of the remnants of a case of wine (often only the bottles), or a last season's suit of fine clothes, is often very trifling, but the owner may feel that he has derived from them enough pleasure to offset their depreciation. Yet many persons will buy diamonds in elaborate mountings, and after wearing them for many years, feel that they have been imposed upon if they do not receive for them 100 cents on the dollar.

The assurance that all diamonds sold (always at a fixed price) would be taken back within two years at ten per cent. less than cost, and at an invariable price, assisted in building up one of the largest jewellery houses in the world, and gave great stability to the diamond business. This rule was only rescinded during the panic of 1873, when scores of customers were eager to turn their diamonds into money. Any reliable house ought to be willing within a reasonable time (and it is still done within one year by some) to exchange diamonds for others of the same value, or, on the addition of the necessary cash difference, for stones of greater cost.

## The Lever Escapement

### CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. Grosclaude, Professor at the Geneva School of Horology.

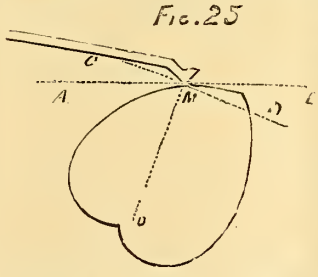
(Translated from the French.*)

*(Continued from page 153.)*

* We are informed by M. E. Gardy that the above article was originally written for the *Journal Suisse d'Horlogerie;* our translation is from a pamphlet published in Geneva.

LET us apply the foregoing to some particular cases, and take at first a chronograph heart. In order that the sliding take place when the lever presses upon it, it is necessary that the direction A B (fig. 25) of the part of the heart in contact makes, with the line C D (which is perpendicular to the line O M passing by the centre of motion of the heart), an angle superior to that which corresponds to the coefficient of friction of the two rubbing parts. Thus, admitting this coefficient to be equal to 0.15, we will draw the tangent A B by the point M, therefore a line, C D, making with this tangent an angle of 8° 32′; corresponds to the coefficient 0.15; and if the perpendicular M O upon this line C D passes by the centre O, or to its left, the sliding will not take place. This can be remedied by increasing the pent of the curve, or by diminishing the friction by the polish of the rubbing surface.

Fig. 25




In the single roller lever escapement, when the guard touches the roller, the line A B (fig. 26) should not be perpendicular to the axis of the fork O M, if the angle which this line makes with

the tangent to the roller represents the angle that corresponds to the coefficient of friction. There would then be a sharp stop in the swing of the balance. This explains why in practice it is necessary to prevent the contact of the guard being made near the line of centres.

If we are able to determine the moment when there is arc abutment when we know the coefficient of friction, we can also reverse the question and seek to determine experimentally the coefficient of friction by means of the abutting arc. We have thus been led to construct a simple instrument, of which here is the description :—To ascertain the coefficient of friction existing between two bodies, B and C D (fig. 27). —Upon a vertical bridge, M N, we trace a perpendicular line, A B, upon C D, or upon the base of the instrument. We take a horizontal distance, A E, equal to A B, and divide it into 100 equal parts. Upon the body B we place a rigid arm, A B, of which one of the faces (quite straight) touches the two supports, *a* and *b*. Let us incline this arm by placing the finger on the upper end ; the sliding of the body B upon the surface C D will then take place. Taking note of the figure of the division, the latter is, without further calculation, the coefficient of friction.

FIG. 26

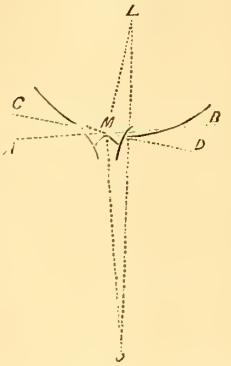
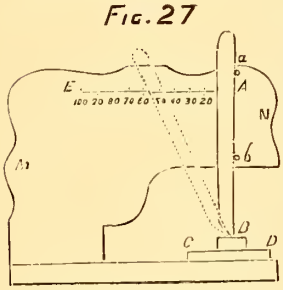
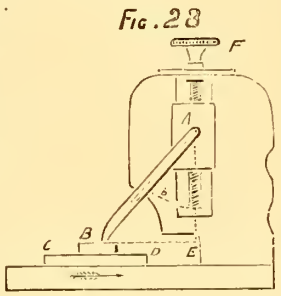



FIG. 27




Meanwhile it is recognised that the coefficient of friction for two given surfaces is not the same during the motion as when the body passes from repose to motion. The above experiment only gives us this latter result, which is always larger. A slight change in the disposition of the apparatus will allow of our also determining the coefficient during movement.

FIG. 28




The arm A B (fig. 28) can turn around a pin, A, carried on a column which can be raised or lowered by means of the {screw / bolt / nut} F. The other end holds the body B at rest. If now this arm A B is tolerably inclined, we can make the block C D slide under the piece B in the direction of the arrow. But if, gradually, we place the arm always more vertically, we shall arrive at the arc abutment *during the movement*. Irregularities in the polish of the surface will make themselves easily felt.

The distance measured B E will give the value of the coefficient of friction, but not so simply as in the preceding case. In effect, the distance A E, which should be taken as unity, here varies at each instant. The values of B E will be obtained by the following formulæ :—

$$\sin \beta = \frac{B\,E}{B\,D},$$

$$f = t\,g\,\beta,$$

f always designating the coefficient of friction. A rule can be previously devised for these formulæ, and will thus give directly the result sought.

The instruments we have described only have the advantage over the methods generally employed up to the present for ascertaining coefficients of friction, in that they allow of determining them more easily when a friction takes place between very small points and surfaces—cases which frequently occur in watchwork —and which interests us particularly here, since we are occupied with the friction of the point of the tooth of the wheel upon the jewelled pallets of the anchor.

*(To be continued.)*

# Gazette.

PARTNERSHIPS DISSOLVED.

Wordly Brothers, Cannon Street, and elsewhere, jewellers. A. Culf, and C. Culf (trading as Arthur Culf), Sheffield, Brittania-metal manufacturers. Tya & Jenner, Birmingham, goldsmiths. T. Galloway, W. Buckland, Wilmington Square, Clerkenwell, engravers. Messer & Hart, Hatton Garden, diamond merchants. Marsh & Smith, Runcorn, pawnbrokers. A. Kuss & Co., Newcastle-upon-Tyne, clock makers. G. A. Mills & Co., Birmingham, silversmiths. M. Whiteacre & C. Smith (trading as Chas. M. Smith). Birmingham, die sinkers.

## THE BANKRUPTCY ACT, 1883.

RECEIVING ORDER.

*To surrender in the Country.*—John Palin, Nantwich, jeweller.

ADJUDICATION.

*In the Country.*—Edward T. Windibank, Upper Norwood, watchmaker.

NOTICES OF DIVIDENDS.

*In London.*—M. Rosenberg (trading as Oswald Roscuberg), St. Paul's Road, Canonbury, wholesale jeweller, 9¾d. second and final ; any Wednesday, Scear, Hasluck & Co., 23, Holborn Viaduct, E.C.

*In the Country.*—C. M. Caine and G. O. Caine (trading as Caine Brothers and J. Edwards & Co.), Liverpool, pawnbrokers, 3*s.* 2*d.*, first and final ; April 16, Trustee, Liverpool. C. M. Caine (separate estate) 1*d.*, first and final ; April 16, Trustee, Liverpool. G. O. Caine (separate estate), 8*d.*, first and final ; April 16, Trustee, Liverpool. R. Stuart, Bolton, clock spring maker, 7*s.* 4*d.*, first and final ; April 25, 16, Wood Street, Bolton. E. Welbourn, Ilkley, jeweller, 2½d., second and and final ; April 20, Official Receiver, Wakefield. J. Britton, Nottingham, watchmaker, 2*s.* 6*d.*, composition, first instalment ; April 25, Official Receiver, Nottingham.

SCOTCH SEQUESTRATION.

J. Carswell, Kilmarnock, watchmaker.

## BANKRUPTCY.

*Re* WILLIAM JARDINE.—The bankrupt was a diamond merchant, carrying on business at Great Winchester Street, E.C., and failed in October last with debts unsecured £57,501 15*s.* 2d., and assets £9,759 5*s.* 3d. He applied last month for his order of discharge. The Official Receiver, in his report, made grave charges against the bankrupt, including, amongst others, that of fraudulent breach of trust under these circumstances.—A Mrs. Roe gave him a diamond and emerald brooch to sell for her, which the bankrupt sold for £800 in February last year, receiving the money the day following the sale. He did not pay the money over to Mrs. Roe, however, but concealed the fact that he had sold it for £800, and after considerable correspondence, he told her that he had sold the brooch for £650, and suggesting as the money had not been paid to him, that he should give bills to her for that amount. No payment, however, was made to Mrs. Roe, and the bankrupt filed his petition. Upon the grounds of the offences alleged in the report, the discharge was opposed by the Official Solicitor and the trustee.—The arguments in the case occupied a a considerable time, and in the result the Registrar considered the offences had been proved, and said that the transaction between the bankrupt and Mrs. Roe, although perhaps it did not come within the penal clauses of the Debtors Act, was still of so fraudulent a character that he was compelled to refuse the discharge of the bankrupt altogether.

NOTTINGHAM.

*Re* WILLIAM COADY, watchmaker and jeweller, Hanley.—The public examination of this bankrupt was held at Hanley last month, before Mr. E. Tennant, registrar. The liabilities amounted to £275 11*s.* 10d., and the deficiency was £181 18*s.* 8d.—In answer to questions by Mr. T. Bullock, Official Receiver, the bankrupt stated that he commenced business in August, 1884, as a working watchmaker, without any stock and without capital. In October, 1885, he commenced to keep stock and to purchase on credit. During his subsequent trading the only time he took stock was in February last, and as he then found that he was insolvent, he executed a deed of assignment in favour of Mr. Cohen, Jeweller, of Birmingham, Mr. Moston (Hayes and Moston, accountants, Hanley) being appointed trustee.—The bankrupt was examined at some length with respect to a gold watch, which he alleged that Mr. Hayes had taken as security for the costs of his firm in preparing the deed of assignment, and also with regard to articles of jewellery which he stated that Mr. Hayes and Mr. Moston had obtained without payment. As to the latter he stated that Mr. Moston had paid 5*s.* on account of jewellery worth 32*s.*, and he also alleged that Messrs. Hayes and Moston had sold for £38 stock and fixtures which he valued at £127.—On the application of the Official Receiver the examination was adjourned until the 29th instant.

CARDIFF.

WILLIAM MORRIS, working jeweller, Cardiff, next came up for examination. He commenced business in Cardiff fourteen years ago with no capital. He went into Custom House Street, Cardiff, in 1884, where he opened a shop with stock from a Birmingham firm, the arrangement being quarterly payments. He now owed them £369 4*s.* 9d. No books of account had been kept. Twelve months ago he had to resort to the assistance of pawnbrokers to meet his accounts. He had commenced pledging in October, 1886. He had also a shop in the arcade, where there was £260 worth of goods, which had been seized by Mr. Clarke on behalf of Mr. Haydn.—Examination adjourned for particulars of goods pledged.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C.; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

4,485. F. Maddick and J. Greenwood, London, for "Improvements in extracting gold and silver from refractory and all other ores by electro-chemical chlorination, and also in recovering the whole of the chlorine by the same process." Dated March 23, 1888.

4,566. A. F. St. George and A. St. George, Redhill, for "Improvements in the construction of watches and clocks." Dated March 26, 1888.

4,588. M. Cross, Bristol, for "An improved attachment for the pins and catches of brooches, shawl pins and the like." Dated March 26, 1888.

4,614. G. P. Wehlen, London, for "Improvements in the regulating of all kinds of watches and travelling clocks." Dated March 26, 1888.

4,666. T. P. Wood, Walker Gate, near Newcastle-on-Tyne, for "Improvements in watch keys." Dated March 27, 1888.

4,685. W. P. Thompson, Liverpool, for "Improvements in or relating to watches and other time-pieces." (Communication from F. Terstegan, U.S.) Dated March 27, 1888.

4,730. G. Venables, London, for "An electro-magnetic time-piece." Dated March 28, 1888.

4,847. S. A. Rogers, Manchester, for "An improved apparatus for winding 'Waterbury' watches, or other similar machines." Dated March 31, 1888.

4,857. W. Pearce and G. F. Spittle, Birmingham, for "Improvements in solitaires, sleeve links, dress studs, and other like dress fasteners." Dated March 31, 1888.

4,989. W. H. Beck, London, for "Improved devices for winding clocks." (Communication from Charles Diette and C. Hour, France.) Dated April 3, 1888.

5,045. J. H. Ross, Dublin, for "Lamp clock." Dated April 5, 1888.

5,067. J. Carpenter, Kensington, for "Carpenter's improved pendulum clock." Dated April 5, 1888.

5,349. C. Walker and W. D. Ramsey, London, for "Improvements in and relating to clocks and other apparatus used for advertising purposes." Dated April 10, 1888.

5,424. W. H. Ireland, Birmingham, for "Improvements in watch keys and other keys of any description, but principally adaptable to watches and clocks." Dated April 12, 1888.

5,547. J. T. B. Bennett and T. Clark, Birmingham, for "Improvements in solitaires, collar studs, sleeve and cuff links, fasteners for dress and other purposes." Dated April 14, 1888.

5,608. T. Archer, London, for "A device to be used for teaching children to tell the time by a clock or time-piece, and for advertising purposes." Dated April 16, 1888.

5,703. P. A. Newton, a communication from the Ansonia Clock Co. (Incorporated), U.S., for "Improvements in watches." (Complete specification.) Dated April 17, 1888.

5,748. E. Broderick, Manchester, for "Improvements in the striking mechanism of clocks and other time-keepers." Dated April 18, 1888.

5,860. J. Skarek, London, for "A new or improved bow for keyless watches, and method of attachment." (Complete specification.) Dated April 19, 1888.

## Recent American Patents.

| | |
|---|---|
| Advertising Clock. G. Hoisholt | 378,589 |
| Apparatus for Decorating Metals | 379,092 |
| Bath for Extracting Aluminum and Alloying it with other metals. W. A. Baldwin | 380,161 |
| Bracelet (Design Patent). L. P. Juvet | 18,189 |
| Button. Shubael Cottle | 378,923 |
| Combination Spectacles. Bernard Krause | 378,965 |
| Combined Paper Knife and Stamp Holder. B. Ric | 379,415 |
| Cuff Holder. S. P. Babcock | 378,862 |
| Dial Calendar, with Day Indicator. Carl F. Sinn | 379,293 |
| Embossed Metallic Plate. A. C. Hafely | 378,442 |
| Machine for Regulating Time-pieces | 379,511 |
| Manufacture of Clock Cases and other articles from Plastic Material. R. P. Coughlin | 379,450 |
| Method of Decorating Metal. John Baynes | 378,420 |
| Method of Decorating Metallic Surfaces. John Baynes | 378,422 |
| Method of Etching on one or both sides. John Baynes | 378,423 |
| Method of Ornamenting Metal. John Baynes | 378,421 |
| Ornamentation of Spoon Handles (Design Patent). E. T. Schoonmaker | 18,169 / 18,170 |
| Pin and Attachment for Jewellery. Louis Sterne | 378,908 |
| Safety Watch Pocket. Anna Dornitzer | 380,279 |
| Seconds' Setting Mechanism for Time-pieces. Fred Terstegan | 379,833 |
| Sleeve Button. Louis de Frenot | 378,956 |
| Spectacle Case. William F. Cloud | 379,936 |
| Stem Winding and Setting Mechanism for Watches. D. H. Church | 379,050 |
| Stem Winding and Setting Watch. Oscar F. Stedman | 380,226 |
| Stem Winding Watch. David Perret | 378,974 |
| Stop Watch. H. A. Leonard and Gover Kettlewell | 379,963 |
| Stop Watch. H. A. Lugrin | 379,075 |
| Stop Watch. Victor Jeannot | 378,592 |

*This consists of the combination, in a stop watch, of two sets of hands, a train of gearing for driving both sets of hands simultaneously, and independent mechanism for returning either set of hands to 0.*

| | |
|---|---|
| Watch Case Pendant. Peter Henry | 378,959 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. Truslove, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Correspondence.

*All Letters for Publication to be addressed to the* Editor *of* The Watchmaker, Jeweller and Silversmith, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

To the Editor of *The Watchmaker, Jeweller and Silversmith.*

Dear Sir,— I think it is quite time the trade took action against the impostors that are setting themselves up to "clean and repair" watches for one shilling; perhaps you, Mr. Editor could suggest something through the medium of your interesting paper. I for my part have had 5,000 handbills printed, like the enclosed, which I took from the October Number of last year, bottom of 1st column, page 51, and which I am circulating all over the place, besides making wrappers of them for the jobbing that goes out, and sticking them about the premises. A few words to the trade through your paper might wake up the shopkeepers to the necessity of doing something to eradicate these frauds on the public who are certainly no workmen, otherwise they would not lower themselves to such a lie.

Yours respectfully,

E. C. Bourdelot.

300, Kennington Road (Triangle),
Kennington Cross, S.E., *April* 24, 1888.

The following is the extract referred to :—

Watch Jobbing is passing through a very trying ordeal at the present time; a few indifferent workmen having commenced repairing at starvation prices (which cannot possibly last long), are doing considerable injury to that branch of the trade by creating a false impression among the public that a watch can be cleaned for One Shilling. The public will find in time that this is quite impossible, and that they have been imposed upon by bogus workmen; they will arrive at this conclusion when their watches have been "*cleaned and repaired*," about six times, where once should have sufficed, and that their watches have been considerably damaged into the bargain. In the meantime conscientious workmen are suffering, but they will reap their harvest later on.

From "*The Watchmaker, Jeweller and Silversmith*," Oct. 1887.

[The method adopted by our Correspondent seems to be about the most practical way of exposing such tricks. The question is one of supply and demand. So long as there is a stupid public to be gulled, so long will there be found unscrupulous persons to take advantage of the fact, to the injury of the legitimate workman. What the latter should desire is that the public be educated up to the point of discriminating between the bogus and the true in all branches of the trade. This is, however, a millennium which we are very far from at present. Meanwhile, watch repairers would do well to follow the example of Mr. Bourdelot. We, on our part, will do our best to keep members of the trade in touch with one another.—Ed.]

# Buyers' Guide.

**The Sheffield Smelting Company,** Sheffield, *Sell* Gold and Silver (pure and alloyed). *Buy* all materials containing Gold and Silver.

**Jones, E. A.,** Wholesale Manufacturer of Whitby Jet Ornaments. A Large Assortment of the Newest Patterns always in Stock. Export Orders promptly executed. Persons not having an account open will avoid delay by forwarding a reference with their order. Customers' Matchings and Repairs with despatch. 93, Hatton Garden, London, E.C.

**W. Scott Hayward & Co.,** 59, Deansgate, and Barton Arcade, Manchester. Wholesale Jet Ornament Manufacturers, Jet Cameo Cutters and Rough Jet Merchants. Approval parcels sent on receipt of order, if accompanied with trade references. Repairs and matchings executed on the day received. Works: Manchester and Whitby. Agents at Liverpool, Leipzig and Paris.

**S. Ockenden,** Chronometer and Watch Jobber to the Trade, 155, Goswell Road, London. Staffs, Pinions, Cylinders, Conversions, &c. Price list on application.

**T. & J. Bragg,** Vittoria Street, Birmingham, Goldsmiths, Jewellers, Diamond Mounters, Art Silversmiths. *By special appointment to Her Majesty the Queen.* Royal and other orders, and Insignia, Mayoral Chains, Maces, Corporate Seals, Caskets, Keys, Swords, Masonic Jewellers.

## WANTED.

WANTED by a GOOD WATCH JOBBER, age 27, single, an engagement to one of the Colonies.—Address E.W.D., Office of this paper.—[ADVT.]

## TO BE SOLD.

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## Editorial.

IT would seem as if the phraseology which is customarily, or perforce, used in legal documents is in itself sufficient to daunt all but the undauntable in matters of the kind—the long-practised investigator, the expounder of cryptology who positively enjoys such reading, or the expert who takes a professional interest in the manner in which the matter is set forth—that it invests them with a species of cabalistic mysticism, the obscurity of which is utterly impenetrable to an average mind.

This disinclination, which in many cases almost amounts to absolute dislike, on the part of the ordinary man of business for the mastery, or even the perusal *in extenso*, of such documents may account for the fact that the Merchandise Marks' Act, as it affects the various trades to which it applies, is still but so very imperfectly understood by the great majority of manufacturers and dealers. It is certainly to the credit of those who drafted the Act in question that it is an altogether less complicated piece of mechanism than such enactments usually are; and it is perhaps owing to the common reputation of lawyers' productions and legislative statutes, generally, that everyone engaged in trading pursuits has not mastered at all events its salient points. But, notwithstanding its comparative simplicity, it is sufficiently formidable, and requires no inconsiderable amount of study on the part of the ordinary reader before its various drifts and objects can be readily understood, apart from the interpretations to be placed on several of its clauses which involve technical and legal considerations of a novel kind, upon which *opinions* of eminent counsel are extremely diffident, not to say vague.

Any further simplifications of the measure, or explanations of its meanings, should be, therefore, acceptable to all persons engaged in businesses that are likely to feel the effects of its operation.

We have, from time to time, as they have appeared, called attention to publications to this end, and, while writing these remarks, have before us the latest production on the subject, being a complete digest of the Act by Messrs. H. C. Richards,

Barrister-at-law, and Henry Smith, of the firm of Stapley & Smith,* the latter gentleman being eminently qualified by a large business experience to give his legal collaborator good advice on practical commercial details. As might be expected, from the past reticence of lawyers as to the definite interpretation to be placed upon certain technical verbiage, not much light is thrown on points which the trading community, with whom we are especially interested, would like to have definitively settled one way or the other, and the special clauses in the Act that have so exercised watchmakers are not more than touched upon generally.

The work is, nevertheless, a thoroughly good digest of the Act as a whole, and cannot fail to enlighten those who read it with respect to many obscurities which have hitherto puzzled them.

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The great amount of interest taken in the productions and materials of the jewellers' art by the general public just now, is second only to that which the jewellers might be expected themselves to take in all that appertains to their industry.

It is not too much to say that every day one or other of the daily papers contains article, paragraphs or leaderette pertinent to, or cognate with, the industry. Leaving out the innumerable mining schemes (stock and share, bull and bear, business—with which the trade, properly, has nothing in common, excepting in so far as it indicates the supply of the precious stones or metals), big diamonds, discoveries of new materials available for manufacturing purposes, sales of gems and collections, and such like are apparently the order of the day.

Assuredly the jeweller ought to be proud of the premier position allotted to him in the public estimation of his works, as shown by all these portents.

The indications of the coming revival in his business are to be seen on all sides by all but the dullest, or by the pessimist who *won't* see anything good coming to him until it arrives, and even then sometimes will not acknowledge it. But if strong public interest, according to all the outward and visible signs, is not to be relied on as foretelling a coming "boom," and a big one, in all art manufactures of the country, we are very much mistaken, and very bad judges of what is in store for the trades whose interests and our own are identical. Let the manufacturer and distributor look to it—watch the signs of the times, and prepare accordingly; and, above all things, work together for the good of the trade as a community.

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To what extent the jewellery trade is affected by the arbitrary changes of fashion in various other directions it would not be easy to estimate or to assign any cause for, whether the effect is beneficial or otherwise. One of the things our manufacturers do know is that they have to contend with other factors than the ordinary commercial fluctuations, and a fresh departure in a sartorial department is not necessarily indicative of fresh commissions coming to the jeweller. The reason is not far to seek. The same jewellery is of necessity made to do duty on all occasions, where it is worn at all, and the only alternative with the majority of persons is to leave it off altogether. In the sense the word is usually applied to matters of personal adornment, there is no such thing as a "fashion" in jewellery. Persons who *can* wear good jewellery, affect singularity in this respect, more or less, discard it altogether, or as in the case of the family gem jewellery of the aristocracy, make a resetting of the jewels answer for each succeeding generation. With this class of intermittent customers the "fashion" simply amounts to a tendency (a preference for diamonds over sapphires or *vice versâ*), and the ordinary jewellery of commerce can be but little affected by the manner in which their taste is manifested.

Among the masses, indications are from time to time apparent of distinct preferences, such as that for silver jewellery over gold jewellery, and so on, but in this case as in the former, nothing amounting to what might be properly called a fashion in jewellery exists. Much of this state of things is the jewellers' (whether manufacturers' or distributors' does not much matter here) own fault. Much might have been and should be done to educate public taste up to the necessary point for appreciating the beautiful in the productions of an industry which is (from the inexhaustible variety and number of its resources and applications) *par excellence* the most beautiful of art manufactures. It is true the leaders of society always have and always will exercise a great influence on the imitative smaller fry, but they also, in turn, influence one another, and not the least of the disturbing influences to which the jewellery trade is subject, is that at times produced by those enterprising *parvenus*, who, chancing to be the "lion" or "lioness" for the time, start some new so-called æsthetic freak detrimental to the business.

There is obviously something wrong in all this, for while ladies, as a rule, neither design their own dress nor regulate the mode, the ornaments which adorn the former should not be left to their judgment or arbitrary fancies. While on the one hand there are the fashion journals to assist the costumière, on the other hand, there are catalogues of the wholesale houses to assist the retail jeweller, with the facilities thereby afforded for the judicious selection of stock, &c., and, if, with this, he is not able to direct and keep public taste in the right groove (which with a direct contact with his customers he should be able to) if the said catalogues, coming from various manufacturers, differ too materially to afford a reliable guide, other means should be adopted for putting the trade into a closer union with one another than can be effected by individual efforts.

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Badges for the Italian Exhibition.—A series of Badges in gold, silver, and bronze, which are also official passes for the Exhibition, have been designed by Mr. Thomas A. Cutler, the architect of the undertaking, and have just been completed by Messrs. T. & J. Bragg, of Birmingham. It consists of the Arms of the Kingdom of United Italy, the white cross on a field, gules expressed in rich enamel colours, the Imperial crown surrounding it. An oval border forms a basis for both coronet and shield, bearing in raised gold letters the legend "Esposizione Italiana, 1888." The whole forms a fitting jewel to suspend from the watch chain, as a distinctive emblem, and is carried out with correctness and good taste; so that it will be an interesting souvenir of the Exhibition after the occasion has passed.

* London: *Warehousemen and Drapers' Trade Journal* Office, 148 and 149, Aldersgate Street, E.C.

# General Notes.

The library of the Paris Horological School was opened on the 5th ult., at No. 30, Rue Manin. The inauguration of the new school is fixed to take place the last fortnight in September.

While in a state of temporary insanity, Mr. Thomas Matthews, watchmaker and jeweller, of High Street, Shrewsbury, committed suicide last month by taking cyanide of potassium.

In a short article published in the *Revue Chronométrique*, Monsieur Saunier suggests that a use of the artificial rubies of M.M. Frémy and Verneuil, could be found in watchwork, for jewelling the various parts, or that should it not be found possible to produce marketable rubies of sufficient size for this purpose, the small ones could be utilised in a powder for polishing purposes.

The Belgian Burgomasters who have recently been the guests of Lord Mayor De Keyser, presented him with a handsome gold and silver loving cup, which is a very fine specimen of the Netherlands' school of goldsmiths' art. It is ornamented with turquoises and rubies, and bears the following inscription: "Les municipalités Belges au Lord Mayor, M. de Keyser, Londres, Mai, 1888."

The Australian Pearl Fishery Company (Limited), has just been formed to acquire and amalgamate under one control the pearling plant of Mr. E. W. Streeter and other plants, composing the pearling fleet now working off the North-west coast of Australia. The property offered to the Company includes 57 luggers. The capital of the company is £50,100, in shares of £1 each, of which 100 are founders' shares.

Seth Thomas, the secretary of the Seth Thomas Clock Co., died on April 28 last, in the 72nd year of his age. He was the son of the original Seth Thomas who founded the company, and the concern is said to owe a great part of its present prosperity to his business and mechanical ability and energy. His son, Mr. Seth Edward Thomas is the present treasurer of the company.

Shopkeepers' Half-day Holiday.—The agitation commenced about a year ago by the Colne Tradesmen's Association is said to have been attended with beneficial results. The jewellers took the initiative last month, and it is expected that every Tuesday afternoon the closing practice will be adopted by them generally. The association hopes that before long the half-day holiday will become general.

A French Exhibition of works of art was formally inaugurated in St. Stephen's Hall, Westminster, on the 16th ultimo. Although the present exhibits are mostly pictures by French artists, it is stated that a prominent feature of the scheme is that these shall be frequently changed at periodical intervals for bronzes, goldsmiths' and silversmiths' work, &c., the desire being to introduce as many novelties as possible. This should give our designers an opportunity which they would do well to avail themselves of for studying continental art metal work.

The Ruby Mines of Burmah.—Sir J. Gorst, replying to Sir R. Lethbridge, in the House of Commons last month, said that no binding agreement had been entered into by the Government of India with regard to these mines, and that the Secretary of State had maintained his original position of refusing to sanction any leases until full information respecting their value and as to native rights had been received.—Sir R. Lethbridge asked if Her Majesty's Government would sanction the arrangement if they found on inquiry that it was a just one?—Sir J. Gorst said the Secretary of State had sent out an expert to the mines, and he had either made a report or was just about to make a report to the Government of India.

In one of the best-known and oldest-established goldsmith's shops in Berlin the finishing touches are, says *Kühlow's Review*, being put to the marriage gift destined by the officers of the German navy for Prince Heinrich. The present consists of a silver centre-piece representing a lighthouse surrounded by waves from whose summit an electric light may be made to shine by pressing a spring. Round the lower portion of the tower is an imaginative friese by Calandrelli.

A National Co-operative Exhibition will be held in August next at the Crystal Palace in connection with the Co-operative Union, and the Society of Arts are offering bronze medals for the first twenty classes, of which the following will be of interest to our readers:—Class 2.—Art Metal Work. 3.—Metal Work (General). 9.—Engraving on Wood and Metal. 10.—Watchmaking and Turret Clocks. 11.—Cutlery. 14.—Stone, Wood, and other Carving. 20.—Jewellery.

On Saturday, April 28, Mr. David Spencer, who has done so much for the cause of technical education in Coventry was presented by the students of the Horological Class of the Coventry Technical Institute with a photograph of the class, with their teacher, Mr. Joseph Player. The mayor (Mr. Alderman Tomson) in making the presentation, referred in eulogistic terms to work of the Institute, and to the part Mr. Spencer had taken in forwarding the Education scheme. Mr. Spencer in thanking the students for their kindness, said he thought it would have been a good thing if such an institution had been established 25 years ago. Believing, however, that it was never too late to mend, he hoped it would prove to be a real lasting success.

A Traveller related to us the other day, says *Jewellers' Circular* a very good story of himself. It was in his early travelling days; in fact, he had been taken out of the office to make his first trip on the route of the regular traveller who was sick. He visited two or three cities on his route, not meeting with much success, which he attributed to the fact that two or three other salesmen carrying the same lines were just ahead of him. Being afraid the house would be dissatisfied, and a little doubtful of his own abilities, he telegraphed his employer, "Better call me in, there are three rival salesmen ahead of me." Instead of calling him in, the head of the house telegraphed: "Push ahead; there are a hundred other fellows behind you!" So he went ahead, satisfied that he could at least hold his own with the fellows that were behind, with the result that he made such a good trip that he was kept on the road, and his salary increased. He said that idea that there were a lot of fellows following, served to stimulate him, and he determined to go ahead and push things for all there was in him.

The Diamond Market.—The Amsterdam market, although quiet, shows signs of a revival; a few foreign dealers are present and some small amount of business is transacted. The demand for *rough* is somewhat better, and should prices fall there is no doubt considerable business would be done. Manufacturers are not very busy.

The *Paris* trade is also extremely quiet, and few buyers in the market, being quite insufficient to an appreciable impression on the large stocks that have accumulated. The steamers "Moor," "Hawarden Castle," the "Spartan," and two other Union steamers brought a considerable amount of current stuff to the English market during the month, but no important sales were effected, and the London market is generally quiet.

Latest from *Kimberley* report market unchanged and prices steady.

Silver.—On the 17th of last month bar silver fell in the market to the lowest price on record, viz.: 41⅞d. per ounce, while the Indian exchanges were quoted at 1s. 4d. Since then a slight rise took place, but as we go to press the above are still the latest prices.

# Trade Notes.

A FIRE resulting in considerable damage to stock and fixtures occurred last month on the premises of Mr. Thomas Edwards, goldsmith and jeweller, 146, High Street, Dundee. The prompt attendance of the fire brigade prevented the premises from being gutted, and from the nature of the stock, greater damage was done by water and smoke than by the fire, although in some instances the strong heat had actually melted the goods. The damage done is covered by insurance.

THERE are four solid silver trowels to be used in laying the Memorial Stones of the new Wesleyan Chapel at Clayton, and a tremendous array of marble clocks and other articles of beauty and value, all of which are to be given as public presentations. Taken as a whole, the display which Messrs. Fattorini and Sons have now adorning their Kirkgate windows is such as it is rare indeed for one firm to be able to show at one time.

A New Candidate for the favour of the readers of horological jewellery trade literature has just made its appearance in the "Waterbury." The journal, which is the offspring of a parent publication in New York that has now been "going" for some time, is well got up typographically and is illustrated humorously. It is published monthly by the Waterbury Watch Sales Company, Limited, of 17, Holborn Viaduct, E.C.

THE English "Waterbury Watch Sales Company" are now pushing with a view to getting the retail trade here to take up the sale of the Waterbury Watch. Formerly, in America, the Waterbury had been handled by others than the watch dealers, and the trade fought shy of it on that account. Conceiving this to be a mistake, the Company changed their policy, went straight to the trade and shut out all outsiders, with the result that the experiment was a great success. Doubtless the experiment of the English Company will be followed by a like result, as, wherever the Waterbury can be handled at a good profit, it is obviously better that the trade should benefit by it, than outsiders, who can make it the thin end of the wedge for other sales of jewellery, &c.

THE new patent "Castle" sleeve link, illustrated in an advertisement on another page, is one of the few really good ideas in this direction which have been lately brought to our notice. The illustration is so clear that a further description is rendered unnecessary. As stated, it combines simplicity with efficiency, and, from practically testing it by inserting it in and taking it out of a shirt cuff, we can safely say that it is one of the best forms of sleeve link in this respect we have ever had in our hands.

THE Airedale Harriers show a splendid collection of prizes for their Athletic Sports—to come off June 2nd—and these, as well as many others, are on exhibition in the windows of Messrs. Fattorini and Sons, in Kirkgate, Bradford, these gentlemen having made or otherwise supplied the various elegant articles on view. The beautiful silver cup specially designed and made for the Harriers by Messrs. Fattorini, and which was competed for for the first time last year on the Manningham Football ground, when it was universally admired, is of itself well worth inspection. (See September number *Watchmaker, Jeweller, and Silversmith*, p. 35.) Then there are prizes for the Laisterdyke Cricket and Football Athletic Sports; for the Bradford Moor Athletic Sports and some others, and an enormous array of valuable medals, all in some way or other connected with the several festivals. Thus there are nine solid gold and an equal number of solid silver medals for the Oldham Football contest; six silver medals for Cheadle (Staffordshire); six more for Tunstall (Staffordshire); eight silver ones with enamelled centres for Otley Mechanics' Institute, and a very massive gold one to be presented to Mr. D. A. Moulson by the Bowling Old Lane Football Club. Many of these trophies are very heavy and most artistically made and enamelled, the splendid brilliancy of the enamel forming a fine contrast to the precious metals.

AT Birmingham Police Court, on the 2nd ult., Henry Stainton, jeweller, was charged with transferring the hall-mark from certain assayed silver wares to wares of base metal. It was alleged that defendant sent to the Assay Office certain small blanks, ostensibly intended to be moulded into earrings, and having got them marked used them as portions of silver brooches of base metal. The fraud was discovered by the assay authorities using a defective die, the impression from which they could identify. The prisoner, who reserved his defence, was committed for trial at the assizes.

THE levelling tendencies of modern times render it indispensable for caterers to the masses to democratize (as the French term it) their productions, in whatsoever branch of manufacture these may be. In no trades has the necessity for this been more obvious than those which have to do with articles of luxury and personal adornment. The universal desire is now to be ostensibly as good as one's neighbour. This feeling is so well understood by manufacturers generally, that, although the subject offers a fertile field for a very pretty treatise on modern social economy, nothing explanatory of it need be gone into here, excepting in so far as it affects our clientèle. To meet a more wide-spread demand for jewellery of the commoner kind, makers had long laid themselves out, until the manufacture of so-called "Brummagem" goods approximated very closely to the grindery of the sweating system. But even this was not going far enough in cheapening such goods. There was still a demand to be filled outside the very tawdriest of goods constructed in the precious metals. The obvious and legitimate way to meet this demand was the substitution of base metals or alloys for the gold and silver hitherto employed, and to this end various amalgams have from time to time been introduced with more or less success, the chief difficulty being to obtain an alloy that should not only resemble the pure metal when new, but that should maintain its colour in wear. The difficulty, as far as concerns imitation gold jewellery, has now at last, we think, been satisfactorily surmounted by the recent introduction into the market of what is registered as "Kington's Patent Metal," and so far as we have had an opportunity of testing it we cannot speak too highly of it; it fully bears out what is claimed for it by the patentees. The proprietors, the "Kington's Patent Metal Company" of 47, Vittoria Street, Birmingham, intend making the new metal into every kind of jewellery, but at present are confining themselves to the manufacture of 'Albert' and other chains and sovereign purses, in the former of which they have all the conventional patterns. The metal has the rich colour and appearance of eighteen carat gold and will not tarnish in wear, and as the chains, which are well-made and finished, have in addition, a heavy coating of gold on them, they resist the strongest acid tests. They are sold mounted in dozens on a handsome velvet pad and can be obtained from all wholesale houses.

THE *Journal Suisse d'Horlogerie* has opened an essay competition on the subject of casing watches, having special regard to the following points:—Of the case in general as it concerns the protection of the movement against exterior influences (shocks, dust, moisture, &c.), form, joints and fly springs; casing and systems of setting the hands of simple and complicated watches. Precautions to be taken in the construction of the case, principally in complicated watches, in order to secure freedom for the various functions. Pendants and crowns; various systems, especially pointing out the most practical. The concourse will only treat of keyless watches leaving aside keywinders and toy watches. As in former discussions, the Editorial Committee request that the subject proposed be treated from a purely practical point of view. The works are to be written in French, German, or English and sent in to the committee, 2, Rue Necker, Geneva, not later than November 30, 1888. A sum of 150 francs, will be given in one or more prizes; besides which a special diploma will be given to the successful competitor or competitors. Each essay must bear a motto or figure and be accompanied by a duplicate on a sealed envelope in which is the name and address of the writer.

# Birmingham News.

From Our Correspondent.

THE approach of Whitsuntide, coming as it does so close upon the Easter holidays, always seems to have a tendency to keep trade quiet among the fancy lines of goods, such as jewellery, &c.; and the month of May has been no exception to the rule. Manufacturers are, with few exceptions, complaining of the close proximity to each other of the two holidays, and the sentiment seems pretty unanimous that one or both of these holidays might be abolished with advantage; and substitute in their place a general summer holiday of about fourteen days—similar to our American friends. There is a good deal to be said in favour of this plan if only upon the score of weather, for it is generally about as bad as possible here at both Easter and Whitsuntide.

* * *

There is a fair amount of activity among the makers of the best class of gilt work, most of them working full hours, and in a few instances, the workmen were allowed to work overtime to make up for the Whitsuntide holidays.

* * *

Manufacturers of cheap gilt and silver goods are suffering most, there being very few instances of full hours among them, most of them running from 9 a.m. to 5 p.m.

* * *

I hear, upon good authority, that the Spanish branch of Messrs. Blanckensee & Son is closed—at any rate, as far as manufacturing is concerned, the workmen having all been sent back to the Birmingham branch in Frederick Street.

* * *

There are at the present time, five premises vacant in the jewellers' quarter here that would hold from 150 to 200 workpeople each, which were full three years ago; it would be interesting to know what has become of 800 pairs of hands, or thereabouts, during the intervening period.

* * *

In spite of the lessened numbers, the Jewellers' and Silversmiths' Subscription to the Hospital Saturday Fund this year has reached the very respectable amount of £195 2s. 6d., all raised by weekly donations in the workshops, generally not exceeding one penny each man, and one half-penny each boy; this being the combined efforts of 45 manufactories.

* * *

The new motive power, Compressed Air, promises to prove a great boon to small users such as jewellers, silversmiths, watchmakers, polishers, and a number of others engaged in, and in connection with the fancy trades; it appears to be easily applied to existing machinery, and as it can be laid on like the gas it is particularly clean and convenient; it has just been put to a very practical test. The Birmingham Compressed Air Company, Garrison Lane, exhibited an experiment here on Thursday afternoon, May 17, upon three of Messrs. Piercy & Co.'s engines, at their works, 36, Great Barr Street, about half-a-mile distant from the depôt at which the power is generated. The engines at work were ordinary steam engines of half-horse, one-horse, and three-horse power, and the air was conveyed to them in pipes and turned on and off exactly in the manner of steam. A maximum pressure of 45 lbs. was shown, and there was no perceptible difference between working by air and by steam power, and the air was always at command by simply turning on a tap: a variety of work was tried with good success; what a boon to to manufacturers this must prove, and also what a boon to the public. We shall be able to have one chimney stack at Garrison Lane instead of a number about town poisoning the air. Why! it will be a sort of millennium; we can already imagine flourishing town gardens and groves of trees where now nothing but black bricks and soot flourish. This system must prove very serviceable to jewellers who value cleanliness and light so much.

The Birmingham working man evidently appreciates the advantages of being able to meet with his fellows in friendly converse after his day's labours; there are no less than eight working men's clubs come into existence during the last three years in this town; most of them have erected buildings for the purpose—this is another illustration of "union is strength."

* * *

Flowers *versus* jewellery and electro-plate; this is a constantly recurring topic of conversation here, as Birmingham is the seat of the manufacturing jewellery trade, so it also appears to be the great centre for the sale of cut flowers, and the Birmingham market has become one of the sights of the neighbourhood on Saturdays; the stall-keepers and florists have, in most instances, erected backgrounds of black velvet in order to exhibit the blooms to the greatest advantage: there are to be seen *tons* of cut flowers of every kind and colour, and they sell readily both for personal and table decoration, to the great detriment of the silversmiths' and jewellers' trade. In one of his smart eulogies upon flowers, Mr. Ruskin says, after referring to them as the joy of the cottager's window, and children loving them, "*vulgar* people like to see them cut." There must be a great pile of "vulgar people" in Birmingham and the neighbourhood; it is to be hoped the School Board will look after this little matter—the jewellers will be much obliged I am sure.

* * *

The English Watch Co., Villa Street, Birmingham, are making very successfully, in addition to their noted watches, electric lighters, &c., a variety of machine screws: their beautiful small automatic machinery for this purpose is very successful, and they turn out large quantities weekly; this, in addition to their watches, keeps them going in full swing.

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The class of chains known as Canadian gold, and other classes of gold-cased chains, a branch that has hitherto been flourishing, has fallen off this quarter considerably, the makers being glad of the Whitsun holiday to shut out their people for a few days.

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Extensive Robbery of Jewellery at Bradford.—Alfred M. Frost, Woodlands Street, a watchmaker, has been arrested at Bradford, charged with committing extensive jewel robberies at Messrs. Fattorini and Sons, Kirkgate. Till about three years ago the prisoner was in the service of this firm, but set up business on his own account. He periodically made visits to Messrs. Fattorini's shop for the purpose of making purchases of articles used in his business as a watchmaker, and frequently bought also goods for which he had customers. On these occasions, from his long connection with the place, he was allowed greater freedom in the handling of goods than is ordinarily permitted to customers, and for some time past several things had been missed coincidently with Frost's visits. The firm, however, were loth to connect him with these thefts, but some seals being missed, the matter was reported to the police. Notices describing the stolen seals were served upon the pawnbrokers, and as Frost was found to offer one of them in pledge he was taken into custody. A search of his house resulted in the discovery of a large number of pawn-tickets, relating to the pledging of jewellery at various places to the amount of £400. After his arrest, Frost seemed disposed to make a clean breast of the matter, probably in the hope that this course would lead to his being more leniently dealt with. On being placed in the cells, however, he gave way to despondency, and attempted to kill himself by butting his head against the iron door. The cries of a fellow-prisoner attracted the attention of the warder, and measures were adopted to prevent his doing further violence to himself. He had already succeeded in placing his life in peril, his head being severely cut and bruised, and after the wounds had been dressed by Mr. S. Lodge, jun., he was removed to the Infirmary, where he is at present under treatment.

# American Items.

THE New York *Jeweler's Weekly* says:—"If our Spring trade is as good this season as it was last we shall be well satisfied" is a remark which we have heard from various dealers during the past few weeks. There is at present no apparent reason why their wishes should not be realised; in fact, the manner in which the jobbers have placed their orders during the past few weeks justifies us in predicting that trade during the coming season will even surpass that of last Spring. The salesmen who are already on the road send home encouraging reports, and all branches are at work with a degree of confidence which is only born of success.

WHAT do our Lancashire friends think of this? Our English correspondent's prediction, says the same journal, that the United Kingdom and its possessions will yet figure among the largest customers for the cheaper grades of American watches seems to be well founded. If made 25 years ago it would have been regarded as the utterance of an insane person: to-day, coming as it does from a well-informed Englishman, it bears in every feature the impress of truth. "Britannia rules the waves," and America rules the watch trade. This is not poetry, but it is an incontrovertible fact.

THE infinite variety and elegance found in plated ware at the present time is something astonishing. Artistic designs are combined with superior workmanship and elaboration of detail that result in the production of goods that leave nothing to be desired so far as form, style and general appearance are concerned. There is scarcely anything made in fine metals that it is not reproduced or have their counterparts in plated ware. Articles of table service especially are made in exquisite patterns, while recent improvements in the plating processes render them lasting and almost indestructible. The plated ware made to-day by manufacturers of established reputations will last a lifetime without betraying the fact that the silver surface has a foundation of white metal. Articles of bric-à-brac in endless variety are now made in this metal, while utility and ornamentation find expression in thousands of articles, from match boxes to elaborate vases, lamp stands, etc.

THE general opinion in the States is that non-magnetic watches are a positive necessity of the times. When electricity is being introduced into most business houses, and also into dwellings, and made to subserve a great variety of purposes, every one runs the risk of having his watch disarranged by it. A slight current of electricity, which may reach the delicate mechanism of a watch all unknown to its wearer, is sufficient to destroy its reliability temporarily. Various means have been devised for demagnetising a watch, but what watchmakers are striving for is a watch that will not permit itself to be magnetised. Nearly every manufacturer is now announcing that he has achieved this desideratum, and the probability is that all who make this statement have been more or less successful.

Commenting on the Paris letter of a correspondent, a New York contemporary says: The influence of the gay capital on the fashions of the world is as pronounced under Republican simplicity as it was in the palmiest days of the Second Empire: and the fact that for some years past its belles have not chosen to wear much jewellery has not been without its effect on the trade in this country. Judging from the numerous handsome novelties which our correspondent describes as now worn by the fair Parisiennes, they seem to have returned to their love for fine jewellery, thus setting an example which their cousins on this side of the Atlantic will no doubt follow. Indeed, there are already indications that the altogether unwarranted idea that wearing much jewellery is a sign of vulgarity has had its day. Tasteful and artistic jewellery can never be vulgar, and such ornaments as are regularly described among the *Weekley's* "Novelties," need never cause the wearer to feel that people regard him or her as wanting in good taste.

# Charge against a Jeweller's Apprentice.

AT THE LINCOLN CITY QUARTER SESSIONS last month, Charles Blow, 20, watchmaker's apprentice, was indicted for that he, on March 29, then being servant to Mr. J. D. Fisher, of High Street, Lincoln, did steal various articles, together of the value of £3 13s. 9d., the property of his master.

Mr. Stanger was for the prosecution, and Mr. Weightman defended.

Mr. Stanger said the prosecutor was a watchmaker and jeweller of Lincoln, and for the past seven years the prisoner had been his apprentice. He had until latterly borne an excellent character, and had acquired more and more the confidence of Mr. Fisher. About the middle of March certain suspicions were aroused, and a warrant was taken out against the prisoner, and a search was made of his father's house. There certain invoices were found, which seemed to indicate that he had been carrying on a trade with some jewellers in Birmingham. From the father's house the detective officer and Mr. Fisher went to the house of a Mr. Lee, the father of a young lady to whom the prisoner was engaged to be married, and in consequence of a statement there made, they went to a house in Bracebridge and received a parcel, which contained the articles which the prisoner was now charged with stealing, and which had been given to Miss Lee as lover's presents. He should show that every one of those articles were Mr. Fisher's property, had been in his shop, and that the prisoner had had an opportunity of taking them. In a statement which the prisoner had made he said he obtained the goods for a young man named Meedley, who was formerly an assistant in Mr. Fisher's employ, but he should call Meedley, who would tell them that the statement was not correct. Mr. Stanger read another statement made by the prisoner to the effect he had sold several turquoise rings to Meedley and bought from him a number of three-stone diamond gipsy rings, one or two signet 18-carat rings, plated spoons, forks, &c. If that statement were true, the prisoner, who was only receiving 9s. per week, had paid for one item from £18 to £24.

Mr. J. D. Fisher was then called and gave evidence.

In cross-examination he said that up to the time of this charge being brought, the prisoner had borne a good character. As a rule he was engaged in the workshop behind, but he assisted in the front shop when required. He had had an apprentice named Meedley, who left him in the month of February this year. He had had several other apprentices.

Mr. Weightman: Some of these young men, I suppose, had the privilege of purchasing articles of you: used they to do so to your knowledge?

Witness: Very seldom.

When you were out it would not be an offence if any young man sold articles to any other young man in your employ? No.

If articles were sold during your absence from the shop, was it not the custom for the money to be placed on the top of a cupboard? Yes, if I was only away for a short time.

I suppose it is perfectly possible these articles might have been bought from your stock and the money left in that way? It is possible.

I suppose these invoices show Blow was carrying on a business on his own account? I did not know of it until a fortnight before he left.

Mr. Weightman said he saw there were something like 77 invoices in two years from a man named Brown, in Birmingham.

The Recorder: Is it customary to allow one assistant to sell to another? Mr. Fisher: It is not.

The Recorder: I should stop it.

Detective Hockney and Lucy Ellen Lee having given evidence in substantiation of Mr. Stanger's statement,

Thomas Wm. Meedley was called. He said he was an assistant with Mr. Fisher up to Feb. 20 last. To the best of his knowledge he did not sell any of the articles mentioned in the charge to Blow, that was in the ordinary way of business, and he most certainly did not sell them to him on his own account. The statement made by the prisoner to the effect that he had

sold certain articles to Meedley, and bought a large number from him, was read to the witness, who said it was a villainous lie.

Cross-examined by Mr. Weightman : Did you sell any things to Blow? I don't think so.

Did you purchase any things out of the shop ? Yes.

On several occasions ? Yes.

For the purpose of giving to a young lady friend of yours ? One or two things for that purpose.

Did a youth named Dixon, in the employ of Mr. Fisher, decline to take any articles for you ? No.

Will you swear that ? To the best of my knowledge.

Did he tell you his father would not allow him to take articles for you ? I do not think he was ever asked.

Did you, while in the shop sell any articles to persons in Mr. Fisher's employ : I mean honestly ? I might have done ; I don't remember any particular instance.

Do you remember, in the presence of a man named Stokes, who was in Mr. Fisher's employ, selling several rings to Blow ? No.

I suppose you would not swear you did not ? It is possible.

Did you sell Stokes articles ? I do not remember.

Do you remember selling a young man named Carter anything ? I think I remember him buying one or two small articles, but I cannot say for certain whether I sold them to him.

Were they also for the purpose of making a present to a young lady to whom he was attached ? I believe that was so.

Re-examined, witness said, if he sold any articles as suggested he should have told Mr. Fisher, as was customary.

This was the whole of the evidence for the prosecution, and Mr. Weightman submitted he had no case to answer.

The Recorder said Mr. Fisher admitted it was possible those things might have been bought or sold by or to an apprentice or assistant. If it were not for the prisoner's own statement there really would be no case. But the prisoner pledged himself that he bought those things off Meedley. Then it became a question between Meedley and the prisoner. Meedley said he did not remember selling things to Blow : on the other hand, there were entries in the cashbook which the prosecutor could not say did not include the articles in question. The witness Meedley said at first that, to the best of his knowledge, he sold nothing to Blow, but on Blow's statement being put to him categorically, he denied it all. No doubt there was a case for the jury.

Mr. Weightman said he should not call any of the former employées of Mr. Fisher, as Meedley had admitted as much as he could prove by them.

The Recorder said if the jury were satisfied they need not go any further. The prosecution had got to satisfy them beyond reasonable doubt that the prisoner was guilty, and they had got to satisfy them that his statement was absolutely untrue, and that he did not buy those things of Meedley. They must be quite satisfied not only that Meedley was telling them the exact truth, but that he was not mistaken.

The jury thought the case had better go on, and Mr. Stanger summed up for the prosecution, remarking that they were not there struggling for a conviction, but they were simply discharging their duty by placing before the jury, without exaggeration, the plain facts of the case. The question was, did they think it reasonably possible Meedley sold those things to Blow fairly and honestly on behalf of his master, and that Blow obtained possession of them honestly and innocently ?

Mr. Weightman then called Mr. John Dawber, who said he had known the accused ever since he was a baby. He had borne the best character of any lad he had ever known in his life.

For the defence, Mr. Weightman said the accused was sought to be convicted on the most trumpery supposition, dependent upon the evidence of Meedley, and when they came to examine that evidence, and the manner in which it was given, he did not think the jury would hesitate for a moment in saying the case for the prosecution was not made out. It was not for him to say that Mr. Fisher had carried out his business in a loose manner, but it struck him he had not exercised proper supervision. He appeared to have allowed his young men to sell one to another, in the ordinary course of business, out of the stock in his shop, and he admitted he could not tell, after he looked through his cash book, whether the articles had been sold or not. It was not only reasonably possible, but it was highly probable that Meedley sold the prisoner the things. Blow had the money, he had the opportunity, and he declared he did buy them, and neither Mr. Fisher nor Meedley could swear he did not. With regard to the prisoner's statement, did they believe a man of a criminal mind would walk into Mr Fisher's shop and make the only piece of evidence there was against him ?

In summing up the evidence to the jury, the Recorder remarked that it was worthy to note there were only two small items of silver in the articles the prisoner was charged with stealing, the rest being electro-plate, and the natural thing that occurred to one was that if anyone was going to steal things from a jeweller's shop they would hardly take electro-plate. The case against the prisoner looked tolerably black on the face of it. A lot of things were taken away from a shop by an apprentice, and given away to a lady to whom he was engaged. But this was what turned out when the case was thoroughly investigated. Mr. Fisher allowed his assistants not only to sell things to customers, but positively to each other, a thing he had never heard of in 30 years' experience, and which he thought was a slippery way of doing business. Then they found Mr. Fisher frankly admitting that in his cash book there were a great number of articles similar to those mentioned in the charge, and he could not say whether those things in the indictment were not included in them. If it had not been for the prisoner's own statement there would have been no case against him ; but in one way it told in the prisoner's favour, as the things he mentioned as having bought from Meedley were not the articles he was then charged with stealing. Meedley, in his evidence, said that to the best of his knowledge he did not sell any of the things to Blow. The jury must ask themselves if that was the sort of contradiction one would expect from a man in Meedley's position. "To the best of his knowledge" would not do ; it was a criminal charge, and the prosecution had to prove it. Then in cross-examination Meedley admitted he had bought things and given them to a lady, in exactly the same way as Blow had done. If the jury had a doubt at all about the case, the prisoner's good character ought to increase that doubt.

The Jury at once returned a verdict of "not guilty," and the announcement was received with some applause, which was immediately suppressed.

With reference to the above case, we publish in another column, a letter from Mr. Fisher.

## The Glut in the Diamond Market.

SPEAKING of the present output of the South African Diamond Companies, comparing it with that of former years, and speculating on the effect it will have on the trade and market of the future, the *Financial News*, says :—

These Cape diamond companies in the policy they have recently adopted of flooding the market in order to pay fancy dividends on inflated capitals, are gaily cutting their own throats. With very short-sighted jubilation they are killing the goose which lays their golden eggs. Diamonds will cease to be diamonds when they are turned out by barrow-loads the same as coals. They are being robbed of their essential virtue—rarity. Twenty years ago, before Kimberley or De Beer's was heard of, the current supply was a mere fraction of what it is now. Mr. Streeter, in his well-known work, "Precious Stones and Gems," estimated the production of the chief Brazilian diamond field in Minas-Geraes during the first twenty years of its working at 144,000 carats per annum—little more than one month's yield of De Beer's. Up to 1850 there had been obtained from it 5,800,000 carats altogether—about one year's output of the Cape mines. Immediately preceding the Kimberley discoveries the Brazilian supply had declined to little more than £300,000 a year. New stones from India had also fallen away considerably, and the Australian production was very irregular. At this period—say about 1867—the world's supply of diamonds was a mere bagatelle

to what it has since become. It was as easy to get £14 per carat for good stones as it would now be to get one-third of that price. So long as the Kimberley diggers worked only in the river beds, and their exports from the Cape remained moderate, the price was not affected. But when they struck the "pans," or huge basins of blue clay, yielding diamonds by the hundred, the market was very quickly upset. Up to 1871 our imports from the Cape were smaller than those from Brazil; but in that year they took a jump to over £400,000, and in 1872 they shot up to £1,618,000. It was then that the smash came, and West End jewellers, who were carrying stocks of Brazilian diamonds at £12 or £14 per carat, were disgusted to have African stones forced on them at £5 per carat.

For two years Hatton Garden was utterly demoralised, and such large stocks had accumulated both there and at Amsterdam that the supply had perforce to be reduced. Many of the poorer claims at Kimberley were shut down, and the production of 1874 declined to £1,313,000. This check enabled the market to recover itself, and the demand grew steadily for several years; but the supply still kept ahead of it, and in 1881 another glut occurred. The estimated production of that year was over four millions sterling (£4,176,000), and, as might have been foreseen, it broke the market. Restriction had again to be resorted to, so that in 1883 the total output had declined to less than two and a half millions. The years 1884 and 1885 were hard times at Kimberley, but in 1886 a new boom began which is now running its course, and has, to all appearance, nearly reached its climax. The diamond mines are racing each other more wildly and recklessly than ever, and amid all their fine talk about amalgamation and controlling the market, they are evidently preparing for themselves another catastrophe. The production of the current year, if it should continue as it has begun, will be by far the largest in the history of the Cape mines. That of 1887 was formidable enough; but it will be thrown into the shade by the deluge of 1888. Last year the five principal mines in Griqualand West yielded 3,635,000 carats valued at over four millions sterling. To that must be added a considerable quantity for river diggings and the Free State mines. How much may be roughly guessed from the declared value of the total exports for the year, namely, £4,251,000.

Here we have a market which twenty years ago had to absorb only from £300,000 worth of diamonds a year suddenly inundated with more than ten times that amount. What can possibly be the consequence but glut, demoralisation, and financial disaster, as has happened over and over again in the past history of the diamond trade?

## Repairing Coloured Gold Jewellery.

JUDGING from the enquiries of some of our readers, I venture to think that a few practical hints upon the repairing of various classes of jewellery will be very acceptable and useful, as the repairing branch of the trade becomes more and more difficult every year, owing to the demand for light made goods, which, when broken, require all the ingenuity and care that is possible in order to avoid getting into a serious difficulty; for the success of repairing depends very considerably upon the way the job is started upon.

Perhaps the most difficult of all the repairs is that of thin *coloured gold work*, and numerous and annoying are the "flukes" that occur through workmen starting about the job before having made a careful and thorough examination of the article to be repaired, and by this means getting into a fix at the very commencement of it, which, in a good many cases, could have been avoided by a little thought and care. Does jobbing pay? In answer to this question I most certainly say yes—providing the same amount of attention is given to it that would be given to making new work. This is, unfortunately, not always done; some manufacturers do not care to be troubled with repairs, or, if they take them in, they are handed over to an inferior workman who is "good enough for jobs." This is a mistake; it takes a man of considerable skill and long experience to make repairing pay, as, otherwise, the accidents will take all the profit that might have been made. The "jobbing man" must be on the alert for all the tricks that may have been used to patch up a piece of work that has been repaired several times; he must know how to distinguish an old gilt article from a coloured one, and be able to find all the weak points and thin places before attempting to solder or repair in any way, or he may find himself in a "peek of trouble" before it has been in his possession five minutes. A few suggestions as to how to steer clear of these traps for the unwary is what I will attempt to give.

Upon receiving a coloured gold article to be repaired, especially if it is an old one that you may reasonably expect has been repaired several times before, the first thing to do is to ascertain whether it has been repaired with soft or lead solder anywhere, as, if this is the case, and you attempt to hard solder without first removing the lead, the result is that the soft solder burns through the surface of the gold and thus destroys it in such manner as to prevent a job being made of it. If, upon examination you find soft solder present, remove as much as possible by scraping, and then immerse the article in a solution of four parts muriatic acid to one part water—this should be done in an earthenware pipkin, and not a metal vessel; making the solution warm will remove the solder quicker, but it is not altogether necessary, as the cold solution will do it, and is more convenient, the warm muriatic giving off more fumes than the cold. When the solder is removed the article should be boiled in clean water in a copper pan, to remove all traces of acid. Now, before attempting to hard solder the part required to be repaired, cover the work with a solution of borax rubbed fine in water and mixed with charcoal dust into a thin paste; apply this all over the article with a camel hair pencil; then anneal gradually, being careful not to make too hot. Afterwards boil out in a weak mixture of nitric acid and water, and dry in hot sawdust—fine boxwood sawdust is the best, as it does not give out the resinous compound that common woods are liable to do. You will then be able to solder in the ordinary way, with either gold or silver solder as the case may require: that is to say, if the article is strong enough to stand re-colouring, use gold solder; if it is too far gone for this, use silver solder and gild when finished; you will thus make a repair which will give satisfaction to all concerned. It sometimes occurs that a repair is wanted when the article has been so worn and patched as to make it quite impossible to use hard solder of either kind; in this case there is nothing for it but to soft solder, and this may be done much neater and better than is often the case. The important thing to remember is, that soft solder will not take where there is the smallest trace of dirt or grease. Commence then, by washing out the work in hot soda water and soap with a moderately soft brush, dry in hot sawdust, and then scrape the parts to be soldered together until bright and clean; then, if any part has to be added, such as a joint or catch on a plate, or some similar thing, put a coating of solder on the sides to be mitred together by warming them in the soldering gas or lamp and rubbing a copper point, which has already been tinned, over the surface, using a little soldering fluid or Venice turpentine. The copper point is in fact a soldering iron in miniature. Then place the two surfaces together, using a little fresh fluid, and warm them with a small blast from blow-pipe until the solder runs, when the whole will be cleanly and soundly joined, providing the two surfaces fit each other. This method is far superior to that of putting small panels of solder along the mitreing edge, as in hard soldering, and trying to draw it through, as it is generally a failure, the solder preferring to run about the outside surface and cause a deal of trouble afterwards. Now, if fluid has been used, the article must be washed out in *cold* water; hot water will only fix it on and make it dirty for finishing. If Venice turpentine has been used as a soldering medium, wash out in ordinary turpentine and dry in hot sawdust; after trimming up, a little polishing where necessary, and washing out in hot water and soap, again drying in sawdust, it will be ready for gilding, sand blasting, &c.

One of the simplest and most effective fluids for soft soldering is made as follows:—

*Soft Soldering Fluid.*—To a half-pint of common muriatic acid add small pieces of rolled zinc or grains of spelter; the acid will rapidly dissolve the zinc, and a considerable amount of agitation or ebullition will take place until it has taken up all the zinc it can hold in solution, when it will become perfectly quiet. To prove if sufficient zinc has been taken up, put in a fresh piece after all action has ceased, and notice if any further disturbance takes place; if so, put in more zinc until all action ceases, when you may know that the solution is complete. Now filter the fluid through a filter paper placed in a glass tundish inserted into the bottle you will keep it in, and cork up ready for use at any time. This fluid is sometimes used without filtering, but it is much better when filtered, as the solder runs more easily and cleaner then, on account of it being free from the small black residue which is always left at the bottom of the jar in which it has been made. The vessel used for the purpose should be a glass jar or wide-necked bottle, as you can watch the progress of the working with more certainty; it is also advisable to place the vessel in the open air, in order to avoid the hydrogen gas which is liberated in the process, it having a very unpleasant smell.

If the above short code of instructions will be the means of helping some of our readers over a few of the numerous difficulties and vexatious details of this class of repairs, it will add much to the pleasure of the writer. If any points are not made quite clear, or, as is very possible, have been omitted, I shall be pleased to do all that lies in my power to answer them in our next number if questions are sent to the Editor, at the Office of the *Watchmaker, Jeweller and Silversmith.*

A. O.

## The Plate Duty.

IN the House of Commons, last month, on the consideration of the Customs and Inland Revenue Bill, Mr. Slagg moved to insert in page 2, after clause 3 :—"That on and after the passing of this Act, or at such other date subsequent thereto as Her Majesty may fix, by an order made with the advice of Her Privy Council, the Excise duty now payable on plate of silver and gold made or wrought in Great Britain, or in Ireland, shall cease and determine; and that the duty of Customs now payable under the Customs Tariff Acts on imports of plate of silver gilt or ungilt, and on plate of gold, shall also, on the same date, ceased to be charged, and all drawbacks now payable on plate of silver or gold on being exported from Great Britain or Ireland shall cease to be paid." He said that the Chancellor of the Exchequer in his Budget had imposed several new duties, some of which were oppressive to the trade of the country. It would be very acceptable to him and to others connected with our industries to see some relief given to our trade, and he knew no better way in which it could be done than by abolishing these duties on gold and silver plate, which were now antiquated and absolutely barbarous. The Chancellor of the Exchequer had not hesitated to attack other classes. Why, then, did he hesitate to attack this monstrous and antiquated monopoly? He believed that the reason for this backwardness on the part of the Chancellor of the Exchequer was to be found in the action of the Goldsmiths' Company in London. Possibly in anticipation of action to be taken in that House, that worthy, august, and ancient corporation had made haste to incorporate a number of gentlemen sitting on the front bench, in order, as it were to dine down any proclivities they might have towards interfering with these duties. What was the effect of these duties? Our trade in silver plate had declined seriously both in quantity and in quality. In 1886 duty was paid on only 690,000 ounces of silver plate, being 1,000,000 ounces less than in 1825. Not only was this industry oppressed by the system of taxation, but it was rapidly languishing, and must before long expire. But, further, there was another fatal defect in these duties: they crushed out any enlargement of the trade in the direction of artistic development, as any one could see who looked into a silversmith's shop. While in this country the trade was languishing, in America and foreign countries it was improving. The Chancellor of the Exchequer might with justice perhaps plead that it was now too late in the day to make such alterations in his Bill as would meet these grievances, but the right hon. gentleman could at least give them an assurance that he was convinced of the importance of the subject, and would take an early opportunity of dealing with it. He thought that if the House could only be made aware of the loss of employment and the destitution of artistic application caused by the operation of these taxes, there would be a general demand for their removal. The silversmith's art in India was a very ancient one, and many inhabitants of that country were specially skilled in producing silver articles of great beauty. While, however, we professed in this country to be making every possible effort to foster the native art of India, we were really doing all that we could to stifle it and crush it out by meeting it with a virtual prohibition at our custom houses, owing to the fact that it could not pass our hall-marking process. He hoped, therefore, that he would be supported in his proposal by those hon. members who took an interest in the welfare of India. He had made appeals to various Chancellors of the Exchequer, and the answer which he had invariably received was, "Oh, yes, we agree that it is a barbarous and inadequate state of things, but we are held and bound fast by the difficulty of dealing with the question of drawbacks." For his own part, he would not hesitate to deal with the question without taking the question of drawbacks into consideration. Similar action had been taken in other cases, and he did not see why we should stand shivering on the brink. To meet the difficulty, however, he would propose to compromise these drawbacks. He knew that the suggestion he was going to make could not be acted upon now, but he threw it out for the consideration of the Chancellor of the Exchequer—namely, to give, as had been given in former instances, one year's drawback on the whole stock of silver plate. The amount of gold plate was so small that he thought he might leave it out of the question. Taking the average for the last three years, he estimated one year's duty at £50,000, and this sum he would apply to the extinction of all plate duties. That was not a large sum, but he believed that it would satisfy the great bulk of the trade, and the proposal would only be opposed by dealers in old plate. He hoped that hon. members would support this proposed new clause, which would confer a lasting benefit on the commerce of the country.

Sir G. Campbell could not altogether agree that this duty should be entirely withdrawn, for the fact could not be overlooked that it was a tax upon a luxury. He also doubted whether the removal of the Customs' duty upon imported plate would benefit the British trader. Such removal would give rise to a very severe competition from India. The real grievance was that the present regulations in regard to hall-marking had the effect of practically excluding Indian goods from the English market. Indian artificers were highly skilled in this kind of work, and it was one of the industries in regard to which it might be said that India was in advance of this country. He thought the regulations as to hall-marking ought to be so altered as to give India fair play.

The Deputy-Speaker said the only question before the House was the duty, and it would be out of order to enter into the question of hall-marking.

Mr. Vincent said he should have been quite prepared to support the hon. member for Burnley if his clause had ended with the first part, relating to the Excise duty on gold and silver plate wrought within the United Kingdom. But he could not support the second part of the clause, which proposed to abolish the import duty. He did not see how the languishing home trade would be benefited by the market being flooded with base foreign plate.

Sir W. Harcourt, though he sympathised with many of the observations of the hon. member for Burnley, could not entirely agree with him as to the causes which had led to the decrease of this trade. There was a time when good plate was made in this country before George IV. melted down his plate, and had it reconstructed into extremely bad plate by Messrs. Rundell & Bridge. The modern habit of not putting plate upon the dinner table had led to a large diminution of the trade. He

was old enough to remember when it was the fashion to cover a table with plate. Now the fashion was to cover it with flowers instead. He did not think the duty had had much effect in reducing the trade. There was no disputing as to matters of taste, but he could not agree with the opinion that had been expressed that American plate was very superior to ours. With regard to Indian plate, some people admired it more than he did, but there was no doubt that Indian artificers showed great capacity; if the Chancellor of the Exchequer could see his way to dealing with Indian plate in some manner so as to give it fairer play in the markets here, he should have great sympathy with the right hon. gentleman. The tax, however, was one upon a luxury, and it therefore was not a pressing matter, such as it might be if it were a tax upon necessaries.

Sir J. M'KENNA was strongly in favour of the removal of the tax, which, among other disadvantages, was open to the objection that it was an obstacle to the adoption of the system of bimetallism. If that tax were abolished he believed that numbers of persons would engage in the manufacture of silver articles who were now prevented by the duty from doing so.

Mr. WIGGIN said that, knowing the plate manufacturers of Birmingham and Sheffield intimately as he did, he was satisfied that as a body they did not want any alteration in that matter. He had not received a single application on the subject from the manufacturers of Birmingham.

The CHANCELLOR of the EXCHEQUER thought that the question lay in a nutshell. He did not know whether what he had to say would satisfy the hon. member for Burnley, but he might state that if he could he should be glad to do so. It was curious to find how differently the same tax might be regarded even by two members sitting on the same side, the one looking on it as a tax on industry and the other wishing to maintain it as a tax on luxury. He confessed that his own sympathies were rather in the direction of the remission of that duty if it could be done. The hon. member for Burnley had referred to the views of those whom he had called the monopolists; but the hon. member would do him the justice to admit that there were some classes whom he had been obliged to touch by his Budget who were far more formidable than that particular industry, and no opposition coming from a small, though opulent class, would in the slightest degree affect the decision of the Government in such a matter. The hon. member for Burnley had, he thought, to a certain extent, exaggerated the effect of that tax, and he was inclined to agree with the right hon. member for Derby in the opinion that it was not the tax which had prevented an increase in the consumption of that class of manufacture. He could not dispose of the question of the drawback in the same light and airy manner as the hon. member for Burnley. At the same he did not wish to state the question of the drawback too strongly; he desired to be very careful, as he might have to deal with it on other occasions, and therefore he would not enter into controversy with the hon. member on the subject. It was not a question of opposition only—the opposition of the silversmiths in that House would be almost absolutely *nil;* but there was the question of equity as to dealing fairly with the class affected. They were in this position as regarded drawback—that, while in respect of most articles—for example, tobacco and some others—the bulk of them was kept in bond, and a comparatively small stock of them was not in bond; whereas in the case of silver there was practically no manufactured silver in bond. The case of drawback in regard to silver would stand on a different footing, because the duty was paid in a different manner. The question of drawback had seriously embarrassed successive Chancellors of the Exchequer in dealing with that matter. The matter was one of a complicated character, requiring time and close examination for its satisfactory solution, with due regard to the interests of the public on the one hand and to what was equitable towards the manufacturer on the other. If the hon. member would withdraw his proposal he would promise him that he would continue to give the subject his best attention. He could make no pledge as to the time when the matter should be dealt with, as it must depend on the condition of their finances and other circumstances: but his sympathies lay in the direction that he had indicated, and he was especially desirous of remedying the Indian grievance which had been pointed out.

Mr. CHILDERS said it was perfectly true, as the right hon. gentleman had intimated, that his predecessors had experienced great difficulties in connection with that subject. His right hon. friend the member for Mid Lothian proposed the remission of that duty in 1880, and it had also been his own lot to make a similar proposal. When they proposed the abolition of the duty according to two different plans, they were met by a very strong political opposition, which rendered it practically impossible to carry the measure through. He would promise that the Chancellor of the Exchequer should receive from that (the Opposition) side every assistance in repealing that duty. They would not throw in their lot with a small discontented body of silversmiths and use political power to defeat the measure. Probably the right hon. gentleman would be able next year to apply a small portion of any surplus at his disposal for the remission of that duty: and after the assurance which the right hon. gentleman had given, he hoped that the hon. member for Burnley would not press his proposal to a division.

The amendment was then by leave withdrawn.

## Artificial Rubies.

M. FRÉMY, the eminent chemist who presides over the Paris Museum of Natural History, recently submitted to his colleagues a number of polyhedral crystals, demonstrating to the satisfaction of all that the problem of the chemical production of the natural ruby is now practically solved, and that nothing remains but for the industrial world to take possession of the discovery. One of the most competent among the members of the Académie, M. des Cloiseaux, who is Professor of Mineralogy at the Museum, declared moreover that he had made a most minute crystallographical examination of the rubies engendered in M. Frémy's crucibles and could find no fault in them. They were identical in chemical composition and in physical properties with the finest specimens of the natural product. They were of perfect crystalline form, of adamantine brilliancy, of absolute transparency, and without the slightest trace of borium. It is true they were of small size, being not more than two millimètres in diameter. This, however, was the utmost that could be managed at the laboratory of the museum. But the experiment is judged to have been quite sufficient to show what might be done with a large apparatus affording a constant and easily regulated temperature. Not more than 50 grammes of the materials used could be operated upon, with the resources at M. Frémy's disposal, but, having accomplished such results he triumphantly asks what might not have been done if only he had means of operating with a larger quantity. Evidently he would not despair, if provided with more adequate appliances, of producing a ruby to match even that said to have been possessed by the King of Ceylon, which, according to Marco Polo, was a span in length, as thick as a man's arm, and without a flaw, and for which Kubla Khan offered in vain the value of a city. But, of course, M. Frémy himself does not contemplate competing with the ruby merchants. He only shows enterprising people how they may do so. The directions seem so simple that the experiment on a small scale might perhaps be practicable in an amateur chemist's laboratory. M. Frémy obtains his rubies by the action, at red heat, of fluoride of borax on aluminum containing traces of bichromate of potash. It has been only after countless experiments that he has been able to obtain perfect regularity of crystallisation. The crystals first produced were often lamellated and friable. They had no thickness, and were, moreover, generated in a vitreous deposit, which renders their purification almost impracticable. The improved results are due to M. Frémy's better acquaintance with the degree of heat necessary, as the chemical reaction depends upon the temperature. The mixture, after having been exposed for 50 hours to a steady fire, forms a porous deposit, in which the crystals appear. "It is," remarks M. Frémy, "extremely curious and pretty to see the

rubies with their beautiful rose colour and perfect crystallisation emerge from the white deposit which has formed them." A single washing in a flask of water suffices entirely to separate the rubies from their envelope. The flask is shaken, and the ruby falls in a state of complete purity to the bottom. How exactly the artificial ruby corresponds with the natural one is proved by the fact that the analysis of the two gives precisely the same results. In short, we are told that neither the chemist who analyses it, the mineralogist who examines it with the microscope, nor the lapidary, with all his practical skill, could possibly discern the origin of one of these artificial rubies. The discoveries of M. Frémy are calculated, a contemporary thinks, to make the ruby merchants feel uncomfortable. Their case may be even worse than that of the diamond merchants, which is just now very bad. Owing to the largely increased production by reason of the African diamond fields the value of diamonds is said to be diminishing at a tremendous rate, and the Paris trade is greatly depressed. Last year the production in Eastern Africa alone was 3,646,899 carats, which at present prices represent some four million sterling. Then the supplies from Brazil, the Indies, and from Russia are constantly increasing. Until most of the fields now being worked are exhausted, there is every reason to expect that they will get cheaper and cheaper. And by the time that a falling off in the supply once more brings them up again, the manufacture of diamonds may be perfected. But no doubt something else less beautiful, perhaps, but rarer, may then have been hit upon for the adornment of fashionable people.

## The Lever Escapement

### CONSIDERED WITH REGARD TO ITS FORM, INERTIA, FRICTION, &c.

By M. L.-A. Grosclaude, Professor at the Geneva School of Horology.

(Translated from the French.*)

*(Continued from page 166.)*

* We are informed by M. E. Gardy that the above article was originally written for the *Journal Suisse d'Horlogerie;* our translation is from a pamphlet published in Geneva.

### On Friction, and its effects on the Anchor.

AFTER we have enlarged a little further upon what is friction, and upon the manner in which it may be considered, let us apply what we have said to that which more especially occupies our attention—to the loss of motive force due to the friction of the wheel tooth upon the pallet incline.

In the first place, let us pass rapidly in review a few mechanical considerations upon the transmission of force. Given a piece, A I (fig. 29), moveable around the centre O, and representing the tooth of an escape wheel; it acts by its point A upon a face, B C, of another piece, moveable around the centre O′, which represents here the anchor pallet. Let us assume the escape wheel to be drawn in the direction of the arrow by a weight, P, acting upon its circumference. This weight will produce more or less effect, accordingly as it acts at a point, D, more or less distant from the centre O; in other terms, as is said in mechanics, the *moment* of the force which acts upon the wheel is equal to the weight P multiplied by the arm of the lever O D.

But, in order to know the friction, it imports to obtain the pressure exerted by the point A against the face, B C. But a plane cannot re-act against a pressure that is exerted perpendicularly to it, that is to say, in the direction A F. This pressure, which we represent by the weight P′, acts upon a lever O K = O E: and as it must produce the same effect as the weight P acting upon the arm of the lever O D, we put the equation, $P' \times O E = P \times O D$, from which it results that the actual pressure P′ exerted by the point A against the face B C will be as much greater as the radius O K is smaller compared to that of the wheel.

It is this pressure P′ which acts in the direction F A upon the arm O′ H of the anchor; it will be then capable of raising a weight equal to Q′, acting upon an arm of lever of the anchor O E equal to O′ H. The moment of the force which tends to make the anchor turn is thus equal to $Q' \times O H$, or to $P' \times O K$. Let us remark that if the two forces, P′ and Q′, are equal, they will not act on this account at the extremity of the arms of the levers: but, on the other hand, the speeds of rotation are also different from the two mobiles, and they are in the inverse relation of the same two lever arms. Now, if we wish to ascertain what is the weight raised where the pressure exerted by the anchor at a distance from the centre which would be equal to the radius O D of the wheel, it is with the weight P in the same relation, but direct, of the two same arms, so that we always come to the result of which we have already spoken, that that which is gained in force is lost in speed, or that the pressure multiplied by the distance travelled over by it is equal to the resistance multiplied by the distance travelled over by this last: in this, it is understood, friction is left out of the account.

From the preceding we conclude, then, that the two radii, O K and O′ H, give us in order the relation of the speeds of the two mobiles, as well as the pressure exerted at equal distances from the centres. Example: Let a wheel exert by its point, placed at $4^{mm.}$ from the centre, a pressure equal to 1 gramme. Draw the line F A perpendicular to the face B C, and measure the two radii, O K and O′ H, which we find equal to $26^{mm}$ and $38^{mm.}$ The speed of rotation of the anchor will be to that of the wheel as 26 is to 38; and the pressure exerted by the anchor, at a distance of $4^{mm.}$ from the centre will be the $\frac{38}{26}$ of that exerted by the wheel, or the $\frac{19}{13}$ of a gramme.

Let us now introduce friction. The surface becomes rugged—is covered with little inclined planes; and since we have traced the line F H perpendicular to the surface upon which the point acts, we must now draw a line, F′ H′, perpendicular to the face of our asperity; that is to say, making, with the previous F H, an angle equal to that which corresponds to the coefficient of friction, and which will be found in the table (given on page 153). In this case we will take, then, from the relation of the pressures, that of two radii, O′ H′ and O K′, not forgetting that these radii only give us here the relation of speeds which cannot be modified by friction; and, since the relation of the radii O′ H and O K give us the pressure exerted by the anchor without friction, and that of the radii O′ H and O K′ the effective pressure, in taking account of the friction, we shall obtain the resultant by dividing the latter by the former—that is to say, graphically:

$$\frac{O'H'}{OK'} : \frac{O'H}{OK} = \frac{O'H' \times OK}{OK' \times O'H} = \text{resultant.}$$

It will then be easy, with the aid of a drawing, to measure these four radii, and to calculate the relation indicated. This is what we have undertaken for the lever escapement: but although we had made our drawings on a sufficiently large scale, the results would not have satisfied us without a verification of their exactitude, and we have not been able to deduce sufficiently exact comparisons. In order to arrive at good results we have been obliged to have recourse to very extensive trigonometrical calculations, in all cases too long and too little interesting for our readers, so that we passed them with silence. It will doubtless satisfy them to have before them the results obtained.

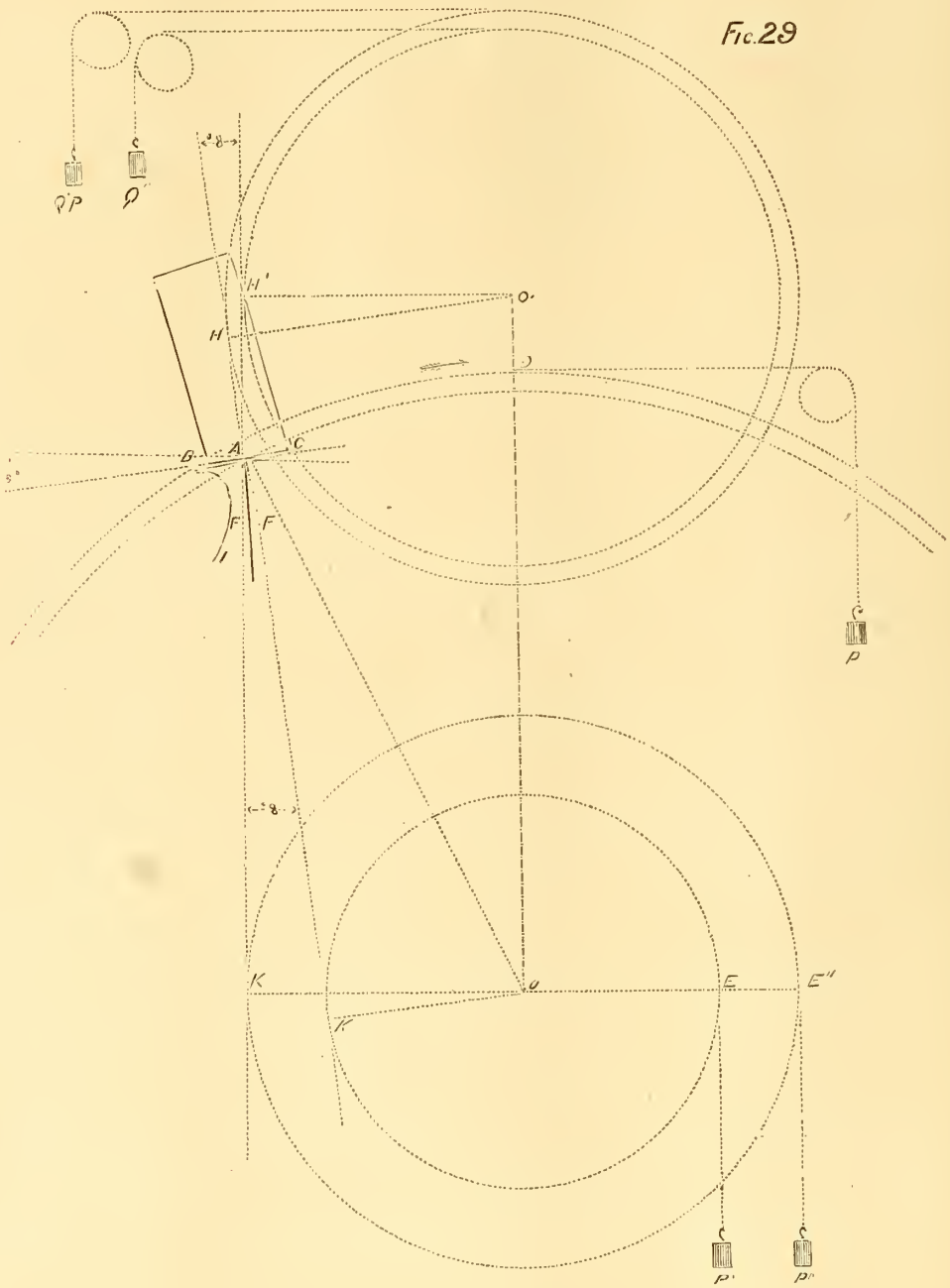
The calculations have been made upon three kinds of escapement: The English anchor escapement, equi-distant pallets; the same, with equi-distant lockings; and the escapement, with equi-distant lockings, but with lift distributed, that is to say, 4° for the incline of the tooth of the wheel, 6° for that of the anchor, and 1½° of locking. For all these escapements we have assumed 10° of total lift, and 1½° of locking. Besides, we have established the resultant in taking account of the friction for four positions from the centre of the anchor: the one, at O′, upon the tangent to the exterior circumference of the wheel (second column of the subjoined table); a second, at D, upon the same circumference of the wheel (fourth column); another at the middle of the distance, O′ D (third column); the last, a fourth, outside the

tangent, and at the same distance as the preceding (first column). The second and the third positions are impossible practically, because they would not permit the passage of the wheel before the fluke of the anchor, but they offer no inconvenience from the point of view of calculation. We have been obliged to imagine some rather eccentric positions, in order to obtain differences sufficiently appreciable ; they permit, besides, of obtaining easily the results for intermediate positions. It is well known that each time we change the position of the centre of the anchor, the dimensions and the forms of the pallets have to be altered in view to obtain always the same lift.

as general mean, because here the lengths of the two inclines are too unlike. This particular has been taken into account.

To express the distance from the centre of the anchor to the centre of the wheel, we have assumed the radius of the wheel to be equal to 1. In this case the centre of the anchor, placed at a distance of 1,1547 (second column), is found upon the tangent to the exterior circumference of the wheel. We have adopted invariably a coefficient of friction of 0,14, and not of 0,15, as is usually done, for the reason that this coefficient corresponds to an angle very close to 8° instead of 8° 31′ 50″, which afforded a slight simplification in the calculations.

Fig. 29




For each escapement with pointed teeth, the calculations have been established for two positions of the anchor—at the commencement of the action of the tooth upon the incline, and at the end. The mean of the two has been taken as general mean, the error committed thus being inappreciable and not in any way influencing the comparisons. For the escapement with double incline, the calculations have been established for four positions, that is, at the commencement and at the end of the action upon each incline ; the mean of these four results has not been taken

Escapement with total lift on the anchor.

*Equi-distant pallets.*

| | | | | |
|---|---|---|---|---|
| Distance from the centres, the radius of the wheel being 1 | 1,2320 ... | 1,1547 ... | 1,0773 ... | 1,000 |

*Entrance lift.*

| | Result. | Result. | Result. | Result. |
|---|---|---|---|---|
| At commencement of the incline | 0,726 ... | 0,738 ... | 0,750 ... | 0,762 |
| At the end " " | 0,688 ... | 0,707 ... | 0,725 ... | 0,743 |
| Mean..... | 0,707 ... | 0,722 ... | 0,738 ... | 0,753 |

*Exit lift.*

| | | | | |
|---|---|---|---|---|
| At commencement of the incline | 0,792 | 0,768 | 0,738 | 0,701 |
| At the end „ „ | 0,686 | 0,647 | 0,602 | 0,550 |
| Mean | 0,739 | 0,707 | 0,670 | 0,625 |
| Mean of the two lifts | 0,723 | 0,715 | 0,704 | 0,689 |

ESCAPEMENT WITH TOTAL LIFT ON THE ANCHOR.

| | *Equi-distant lockings.* Result. | *Entrance lift.* Result. | Result. | Result. |
|---|---|---|---|---|
| At commencement of the incline | 0,690 | 0,703 | 0,716 | 0,730 |
| At the end „ „ | 0,642 | 0,665 | 0,687 | 0,708 |
| Mean | 0,666 | 0,684 | 0,702 | 0,719 |

*Exit lift.*

| | | | | |
|---|---|---|---|---|
| At commencement of the incline | 0,776 | 0,754 | 0,727 | 0,693 |
| At the end „ „ | 0,692 | 0,659 | 0,621 | 0,576 |
| Mean | 0,734 | 0,707 | 0,674 | 0,635 |
| Mean of the two lifts | 0,700 | 0,695 | 0,688 | 0,677 |

ESCAPEMENT WITH DIVIDED LIFT.

| | *Equi-distant lockings.* Result. | *Entrance lift.* Result. | Result. | Result. |
|---|---|---|---|---|
| At commencement of the incline of the anchor | 0,690 | 0,699 | 0,712 | 0,721 |
| At the end of the incline of the anchor | 0,645 | 0,669 | 0,690 | 0,704 |
| At commencement of the incline of the tooth | 0,626 | 0,646 | 0,663 | 0,681 |
| At the end of the incline of the tooth | 0,663 | 0,683 | 0,702 | 0,714 |
| Mean | 0,653 | 0,672 | 0,690 | 0,703 |

*Exit lift.*

| | | | | |
|---|---|---|---|---|
| At commencement of the incline of the anchor | 0,785 | 0,763 | 0,736 | 0,702 |
| At the end of the incline of the anchor | 0,743 | 0,712 | 0,682 | 0,657 |
| At commencement of the incline of the tooth | 0,668 | 0,658 | 0,646 | 0,631 |
| At the end of the incline of the tooth | 0,697 | 0,686 | 0,671 | 0,653 |
| Mean | 0,714 | 0,697 | 0,678 | 0,661 |
| Mean of the two lifts | 0,6836 | 0,6843 | 0,6837 | 0,6821 |

*Résumé of the three Escapements.*

| | Result. | Result. | Result. | Result. |
|---|---|---|---|---|
| Escapement with total lift on the anchor, equi-distant pallet lockings | 0,723 | 0,715 | 0,704 | 0,689 |
| Escapement with total lift on the anchor, equi-distant lockings | 0,700 | 0,695 | 0,688 | 0,677 |
| Escapement with divided lift | 0,6836 | 0,6843 | 0,6837 | 0,6821 |

Let us try some deductions from the preceding data. If we compare the action of the commencement with that of the finish of the incline, in the escapement with pointed teeth, we see that it is more favourable at the commencement than at the finish. This difference for all the escapements is considerably smaller at the entrance pallet than at the exit: about 0.04 for the former and 0.11 for the latter. This difference between the two levers is greatest (0.03 and 0.13) in the escapement with pointed teeth, equi-distant pallets; and smallest (0.05 and 0.10) in the escapement with divided lift. If we approach again the centre of the anchor of the wheel, this difference is diminished for the entrance pallet, and augmented, on the contrary, for the exit pallet. In the escapement with divided lift there is more regularity, as well upon the one lift as upon the other, when the centre of the anchor is brought nearer to the wheel. In this last escapement the most unfavourable instant is when the heel of the pallet begins to slide upon the incline of the tooth, and the most favourable at the commencement of the action.

The total result upon the entrance lever gains when the centre of the anchor is brought nearer to the wheel; while upon the other it loses, whatever be the kind of escapement. If an equal result is desired upon the two levers, the centre of the anchor must be taken outside the tangent to the exterior circumference of the wheel for the escapement with pointed teeth, equi-distant pallets, and within this tangent for that of equi-distant lockings; and still more near to the wheel for that of divided lift—that is to say, a little within the tangent, passing by the point of the tooth.

But if the anchor is brought nearer to the centre of the wheel, it is to the detriment of the total result, the disadvantage being most sensible for the escapement with total lift on the anchor, equi-distant pallets, while it may be said that it is indifferent for that of divided lift. Let us consider, meanwhile, the differences that there are in this latter escapement, by two sketches, of which the one would have the centre of the anchor upon the tangent to the exterior circumference of the wheel, and the other upon the tangent to the circumference passing by the point of the tooth. The diminution of result for the second case is only raised to the two ten-thousandths (0.0002) of the total impulse transmitted. Certainly we regret it, for the partisans of such or such system; but it is necessary to avow—what it is of little use to contest very long—the advantage there is in placing the centre of the anchor more or less far, since it results in so small a difference. Let us recall that it suffices to diminish the drop in the escapement the 74th of a degree only, in order to obtain a gain of 2° in the motive force transmitted, and the little difference of which we have spoken will lose more of its value.

We do not wish to say that there may not be room to choose the different points of departure for the designing of an escapement, in such a way as to obtain the best possible result, but it is not necessary to give to friction, and to the position of the anchor, more importance than these two points merit; because, if it is good to diminish the friction in order to diminish the wear, which is always to be feared, the principal end to attain in a time-measuring instrument is to obtain a good adjustment; and this last depends, if I may say so, upon completeness in the regulating organ, and is not much influenced by a little difference of friction of the wheel upon the anchor, especially if this quantity is constant. There are certainly, in the practical construction of the lever escapement, many other points which imperatively claim the vigilant attention and skill of the constructor, and he may conscientiously not trouble himself too much as to whether the centre of his anchor is planted more or less near to the tangent, if he is naturally careful (whatever be the centre of which he has made choice) to assure himself that all the other dimensions concur to the end sought; that is to say, equal angular lifts, equal drops and as small as possible, the elimination of shocks, vibrations, and other causes or errors that practicians understand much better than the author of the present work on the lever escapement.

## South African Gold Fields.

AT the Royal Colonial Institute, on April 10, Sir Donald Currie gave an address on the above subject, in which he said:—The improvement in the trade of South Africa may be owing, to a considerable extent, to the increased production of gold; for while in 1887 the value of the precious metal exported reached a total of £223,487, only £69,543 represents the value exported in 1885—that is to say, the gold export increases threefold in two years. If we compare this increased export with what it was some years ago, the progress in gold mining enterprise will be better understood. In 1871, the value of gold exported was only £670; in 1875, £39,432; in 1884, £69,000; in 1886, £134,769; and in 1887, as I have stated, the value was nearly a quarter of a million sterling. But this progress is more marked within the last few months, owing to the increased number of stamps at work; for in January of this year the export of gold from the Cape and Natal reached the large amount of £57,562, and in February it had increased to £70,325—equal to an annual export of over three-quarters of a million sterling. The gold output for the first three months of 1888 was nearly equal to the output in the whole of 1887. If,

then, we take into account the gold retained for use in the country, we may assume that the production has already reached a total value of about a million sterling per annum.

Now, you will naturally inquire which are the best auriferous districts, and in what way is gold mining carried on in South Africa ; and you will also ask, is there in the future a possibility of an increased production ? I venture to think that there is practically no limit to the production of gold in South Africa, and for a few minutes I shall direct your attention to the districts where success has attended gold mining operations. I hold in my hand a small nugget of gold which the late President Burgers, of the Transvaal, gave to me in 1875, when he visited me in London. He brought with him a larger lump of solid gold, worth about £600, which I exhibited at the *conversazione* of this Institute : but at that time few people could be induced to believe that large supplies of the precious metal existed in South Africa. These specimens of gold were brought from Pilgrim's Rest, and they indicated alluvial deposits ; but in that district, although a large amount of capital was invested, the success has not been so marked as was expected. The question for the miners was to discover the source of the alluvial deposits, and in what quarter to find the quartz reefs. Ultimately rich gold reefs were discovered at no great distance in the district now known as the De Kapp Gold Fields, of which Barberton is the centre, situate some 3,000 feet above the sea level. This part of the world was practically uninhabited. Few white men visited it, but now the population of Barberton amounts to about 3,000, and the capital invested there in gold mining cannot be less than nearly a million sterling of paid-up capital.

It is within this region that the famous Sheba Mine is situated. It is practically a mountain mass, offering very little indication of visible gold, but so richly does the precious metal permeate the rock that its fortunate claim holders, who had the utmost difficulty at first in paying their way as working miners, have now for their property a marketable value of over three-quarters of a million sterling. Of course, it would be absurd to say that all the district round Barberton is as rich as the Sheba Reef, but the district is so far developed as to give proof of abundant wealth, and we may be well assured that further mining operations will reveal additional treasures.

But another discovery in the Transvaal has produced a rival to Barberton. North of the Klip River, some thirty miles south-west of Pretoria, there were discovered about two-and-a-half years ago veins or reefs of conglomerate known as banket, which have been found to contain remarkably rich deposits of gold. The Government of the Transvaal proclaimed it as a public gold field on July 18, 1886 ; and, when I visited Johannesburg, its centre of activity, I was astonished to see the wealth that lay ready to the hand of the miner. It was in alluvial washings, or in reefs of quartz that gold-mining prospectors had always found their rewards, and no small incredulity was felt when the Witwatersrandt conglomerate was first spoken of in terms of confident expectation. It was said to be a mere fancy of enthusiastic men ; but the population of Johannesburg is now not much under 5,000 ; and I saw dwelling houses, stores, churches, banks and well laid-out streets and squares, where, 6,000 feet above the sea, only 18months before, the flocks of the farmer found pasture, and the large game, which are not yet extinct in the northern district of the Transvaal, roamed at will. There are nearly 1,000 head of stamps at work in the gold diggings of the district ; and it is estimated that the total production of gold in Witwatersrandt for last month was about £70,000.

As indicating to you the value to the Transvaal Exchequer of mining licenses as a source of revenue, I need only state that the amount received for the year ending March 31, 1885, was only £1,359 ; by March 31, 1886, it had advanced to £5,706 ; and at March 31, 1887, to £45,380 ; while the receipts for the six months ending September 30, 1887, show an estimated total of £70,000 a year. The total revenue of the Transvaal has increased by leaps and bounds during the last three or four years. For the year ending March 31, 1885, it was £161,595 ; at March 31, 1886, £177,876 ; by March 31, 1887 it amounted to £380,433 ; while for the six months ending September 30, 1887, it was at the rate of over £600,000 per annum. All this is owing to the gold discoveries.

Away to the north of Pretoria, in the border district inhabited partly by Kaffirs, who claim some kind of independence of the Transvaal Government, there are known to exist exceedingly rich deposits of gold. I speak of the district of Zoutpansberg ; but there is also a large store of mineral wealth upon the lands situated on the western frontier of the Transvaal. The Malmani Gold Fields, not yet developed, give rich promise ; while at Heidelberg, in the same Republic, near the Natal frontier, as well as at Potchefström in the direction of Kimberley, there are operations now in progress which will well repay the enterprise of the capitalist, and of such as are actively engaged in gold mining. It is not in the Transvaal only that gold has been found in great abundance. Gold miners have had considerable success in Zululand and Natal as well : while even in the Cape Colony there are prospects of considerable value. I landed at the beautiful port of the Knysna, situated between Port Elizabeth and Cape Town, and visited the forest of the district, within whose boundaries also auriferous ground has been discovered, in the shape of alluvial deposits with reefs of gold-bearing quartz. The prospects for South Africa are therefore very promising ; and I daresay the possible discovery of gold treasures may enchant the imagination of many of my hearers, indisposed though they may be to adventures and risks. Hence I may repeat what I said in South Africa, how necessary it is to bear in mind that gold mining is an industry, and that assiduous labour, with scientific skill, are necessary as well as enterprise. It has been laid to the charge of those who are connected with gold mining that some properties have been given to the public burdened with too much promotion money or payment to vendors : but it will be a satisfaction to you here to know, as it is highly creditable to those who have at heart the interests of Johannesburg, that a mining board has been established there, which undertakes to supply information to the public and to intending investors with respect to the intrinsic value of the properties declared to be gold bearing, and offered for sale to public companies.

The future of the gold mining industry is of course a question for estimate and prophecy.

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AMONG those presented at the *levée* held by H.R.H. the Prince of Wales, on April 30 was Mr. Chris Bennett, of Sydney, one of the proprietors of the *Australian Town and Country Journal*. Mr. Bennett was presented to the Prince by Lord Knutsford, G.C.M.G.

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THE white alloy registered as "Albo Silver," the excellent chains manufactured from which we noticed at the time of its introduction into the market, is now being extensively made up into various other articles of jewellery, such as ladies' and gentlemen's chains, lockets, seals, bracelets, &c., which are in great demand throughout the trade. The estimate we at first formed of the new material has been fully confirmed by practical experience, and the further extension of its uses should be practically unlimited. The articles of jewellery at present made up have each the registered "Albo Silver" label attached and are stamped with the initials of the manufacturers, N. C. R. Co. They can be obtained from all wholesale houses.

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THE Bracelet Watch Holder, manufactured by Messrs. Appleby & Co., of 124, Vyse Street, Birmingham, which is illustrated in an advertisement on another page, is a great advance on, as it certainly is more worthy of encouragement by all interested in the jeweller's trade than, the leathern strap used for the same purpose that is now so much the fashion. The watch is inserted at the back, or inside of the bracelet, and is held securely by the small button or catch at the bottom and the spring loop that clips round neck of watch at the top. This is so simple that anyone can put in or take out the watch instantly. During the time they have been before the public these bracelets have been very successful, and the makers state that having had so many orders for them in gold, they have had to refuse large orders for them in silver.

## The North-West Australian Pearl Fishery.

By Edwin W. Streeter, F.R.G.S., M.A.I., &c.

In 1872, the "Australian Fishery Company" was floated in London, and two fine yachts were fitted out in England (the "Enchantress" and the "Flower of Yarrow,") for the purpose of prosecuting this industry on the North-west coast. Ample capital was available, but the venture proved disastrous. The promoter actually estimated in his prospectus, that each diver could bring up 100 shells in an hour! and based his reduced estimate upon a yield of eight tons of shell for each diver in the season; as a matter of fact, 1¼ tons is the highest that has ever been obtained, and that only under extraordinary favourable circumstances. The whole proceeding was a fiasco, and ludicrous to all, except the shareholders. The working expenses alone would have eaten up all the profits, even if a reasonable quantity had been obtained. The "Enchantress" was lost and the "Flower of Yarrow" was sold. She traded in the Malay Archipelago for a number of years, running the Spanish blockade in Sooloo several times, and up to the date of her recent wreck was known as the handsomest and fastest craft in the East. The promoters of the scheme came to an untimely end in the wreck of the "Gothenburg."

Pearl fishing has perhaps about it a glamour of romance, but in order to bring about successful results, it requires, as much as any other industry, economy and experience. If ever there was an expedition fated to end in disaster it was this: roomy, even keeled vessels are required, not beautiful yachts, and the failure may be said to have occurred in consequence of the expedition having been carried out in "white-kid glove" fashion.

To the southward of the North-west Cape, the smaller pearl oyster (*Avicula* or *Meleagrina fucata*) is found in Shark's Bay. Here dredging is carried on, and the oysters are allowed to decompose, in order that the pearls may be more easily secured. It is, however, an industry conducted only on a small scale; it is not very remunerative, and presents no features of interest to the general reader.

From the following statistics of exports, which unfortunately are of necessity incomplete, we may trace the history of the pearl-shell fishery in Western Australia so far as our data permit:—

| Year. | Shells, val. | Pearls, val. | Year. | Shells, val. | Pearls, val. |
|---|---|---|---|---|---|
| 1862 | £250 | — | 1875 | £64,642 | £12,000 |
| 1869 | 6,490 | — | 1876 | 75,292 | 8,000 |
| 1872 | 25,890 | — | 1882 | 28,440 | 9,000 |
| 1873 | 28,388 | £6,000 | 1883 | 30,300 | 6,000 |
| 1874 | 62,162 | 12,000 | | | |

In the year 1882—1883 there were employed in the Western Australian fishery nineteen vessels, manned by 539 divers, who raised 250 tons of shell, showing an average of under half-a-ton per man. In 1882, the Union Bank of Australia opened a branch at Cossack and Roebourne. Previously to this the wants of the community were aided by the issue of rough promissory notes, by a store keeper, for any sum between 6d. and £5, and the general acceptance of Dutch guilders as two shilling pieces. The manager of the bank and his assistant were brutally murdered at Roebourne in January 1885. In 1884, a steamer began to ply regularly between Fremantle and Singapore, touching at Cossack, and in 1885 the telegraph line was extended 700 miles from Geraldston to Cossack, thus placing this lonely station within a few hours' communication with Europe. The recent development of Cossack, consequent on the discovery of gold in the Kimberley district, in the north of Western Australia, has already been mentioned.

It may not be out of place to remark that Mr. E. T. Hardman, in his geological exploration of the Kimberley country, a year or two ago, detected gold at a distance of about 140 miles along the course of the Ord and Elvira rivers; this discovery led to the systematic working of the alluvial deposits, and several nuggets of considerable size, one weighing as much as 28 ozs., have been brought to light.

## Workshop Memoranda.

Nickel Plating.—M. Joseph Arène, the French Vice Consul at Mons, in Belgium, calls attention to a new process of nickel plating now in successful operation in that district. By this process a thick plating of nickel may be deposited upon any metal by a feeble electric current in a very short space of time. He gives the composition of the bath as follows:—Sulphate of nickel, 1·00 kilogramme; neutral tartrate of ammonia, 0·725 kilogramme; tannic acid, 0·005 kilogramme; water, 20 litres. The neutral tartrate of ammonia is obtained by saturating a solution of tartaric acid by ammonia. In the same manner the sulphate of nickel must be exactly neutralised. Three or four litres of water are at first added, and the solution is made to boil about a quarter of an hour. The rest of the water is then added and the liquid is filtered or decanted. This bath may be renewed indefinitely by adding the same materials in the same proportions. The deposit obtained is brilliantly white, soft, and homogeneous. Even when obtained of great thickness, there are no irregularities on the surface, and it has no tendency to scale. Some very thick deposits of nickel upon both rough and polished cast-iron goods have been obtained by this process at a cost scarcely exceeding that of copper.

Gilding by Direct Current, or Electro-Gilding.—In gilding by dipping, or simple immersion, it is obvious, says Mr. Alexander Watt, that, as a rule, only a limited amount of gold can be deposited upon the work, and that the application of this method of gilding, therefore, must be confined to cheap classes of work, or to articles which will not be subjected to much friction in use. In gilding by the separate current, on the other hand, we are enabled to deposit the precious metal not only of any required thickness, but also upon many articles which it would be practically impossible to gild properly by simple immersion in a solution of gold. Electro-gilding is performed either with hot or cold solutions; but for most practical purposes hot solutions are employed. When gold is deposited from *cold* solutions the deposited metal is usually of a yellow colour, and not of the rich orange-yellow tint which is the natural characteristic of fine gold; the deposit, moreover, is more crystalline, and consequently more porous in cold than hot solutions, and is therefore not so good a protective coating to the underlying metal. The gold deposited from hot solutions is not only of a superior colour and of closer texture, but it is also obtained with much greater rapidity; indeed, from the moment the articles are immersed in the gilding bath, all things being equal, the colour, thickness and rapidity of the deposit are greatly under the control of the operator. In a few seconds of time an article may be gilded of the finest gold colour with scarcely an appreciable quantity of the precious metal, while in the course of a few minutes a coating of sufficient thickness may be obtained to resist a considerable amount of wear. The superior conductivity of hot gilding solutions enables the operator to gild many metallic surfaces, as tin, lead, Britannia metal, and steel, for example, which he could not accomplish satisfactorily with cold solutions: moreover, hot gilding solutions readily dissolve any trace of greasy matter or film of oxide which may be present on the surface of the work through careless treatment, and thus clean the surface of the work for the reception of the gold deposit. But *cold* gilding solutions are occasionally used in electro-deposition, these Mr. Watt treats separately, as also the special purposes to which they are applied.

## Gazette.

Partnerships Dissolved.

Standring & Collier, Manchester, art metal workers. J. E. Cartwright and G. Myers (trading as E. Cartwright), Birmingham, manufacturing jewellers. Felton & Co., Brighton, jewellers. The Sheffield Nickel and Silver Plating Co., and Draper & Neill, Sheffield, electro-platers. Squire, Heaton & Son, Sheffield, pawnbrokers. Lickert & Ketterer, Norwich, watchmakers.

THE BANKRUPTCY ACT, 1883.

RECEIVING ORDER.

*To surrender in the Country.*—Samuel Hughes, Llangollen, watchmaker. Samuel Wm. Shearing, Bristol, jeweller. Henry John Laycock, Hucknall Torkard, jeweller. Heap, Sarah Ann, Burnley, watchmaker.

PUBLIC EXAMINATIONS.

*In London.*—C. Medlock (trading as C. Medlock & Son), New Street, Dorset Square, watchmaker.

*In the Country.*—T. Breese, Birmingham, engraver; June 19, at 2. Sarah Ann Heap, Burnley, watchmaker; June 14, at 11.

ADJUDICATION.

*In the Country.*—S. W. Shearing, Bristol, jeweller. H. J. Laycock, Hucknall Torkard, jeweller. J. Palin, Nantwich, jeweller. T. Breese, Birmingham, engraver. Sarah Ann Heap, Burnley, watchmaker.

RECEIVING ORDER RESCINDED AND ADJUDICATION ANNULLED.

F. A. Grœbert (trading as Cameron & Co.), Wilton Road, Victoria Station, jeweller, May 16.

NOTICES OF DIVIDENDS.

*In London.*—E. Miroy, Beaumont Street, Marylebone, importer of clocks, 8½*d.*, first and final; any day except Saturday, Chief Official Receiver, 33, Carey Street.

*In the Country.*—F. C. Mumford, Crewkerne, watchmaker, 2*s.*, second and final; Official Receiver, Salisbury. S. Southey, Manchester, jeweller, 2*s.*, first; 27, Brown Street, Manchester. H. J. Hayhurst, Hastings, jeweller, 1*s.* 4*d.*, first and final; May 29, Official Receiver, Brighton.

SCOTCH SEQUESTRATION.

W. V. Jackson (trading as Wm. V. Jackson & Co.), Glasgow, jeweller.

## *APPLICATIONS FOR LETTERS PATENT.*

The following List of Patents has been compiled especially for *The Watchmaker, Jeweller and Silversmith*, by Messrs. W. P. Thompson & Boult, Patent Agents, of 323, High Holborn, London, W.C; Newcastle Chambers, Angel Row, Nottingham; and 6, Lord Street, Liverpool.

6,020. E. F. L. Grandjean, London, for "Improvements in watches." Dated April 23, 1888.

6,104. J. Weirich, London, for "Improvements in treating auriferous and auro-argentiferous ores." Dated April 24, 1888.

6,460. H. H. Lake, a communication from F. J. Seymour, United States, for "Improvements relating to the separation or extraction of aluminium, or compounds thereof, from ores and other substances, and to fluxes and apparatus therefor." (Complete specification.) Dated May 1, 1888.

6,522. W. Tabberner, Birmingham, for "An improved double brooch or fastener." Dated May 2, 1888.

6,584. W. Maund and C. Millechamp, Shobdon, for "The self-acting field clock gun." Dated May 3, 1888.

6,614. E. G. Craven, London, for "Improvements in the electrical illumination of clock dials, and apparatus in connection therewith." Dated May 3, 1888.

6,652. D. Tunks, Halifax, for "Improvements in watches." Dated May 4, 1888.

6,773. T. Calliphronas, London, for "Improvements in clocks and other time-keepers." Dated May 7, 1888.

6,789. A. Young and R. H. W. Leader, London, for "Dials for clocks, watches, and time-pieces." Dated May 7, 1888.

7,159. S. T. Dahl, London, for "An improved method of, and apparatus for, amalgamating gold and other metals." (Complete specification.) Dated May 14, 1888.

7,187. J. B. Hannay, Glasgow, for "Improvements in treating ores for the obtainment therefrom of gold and other metals." Dated May 15, 1888.

7,322. R. C. Marsh, Birmingham, for "Improvements in watches." (Complete specification.) Dated May 17, 1888.

## Recent American Patents.

| | | |
|---|---|---|
| Button. Frank P. Barney ... ... ... ... ... ... | | 381,319 |
| Clock. Arthur Junghans and H. E. Junghans ... ... ... | | 381,626 |
| Clock Movement. A. E. Hotchkiss. (Re-issue) ... ... | | 10,920 |
| Electro-Magnetic Spectacles. J. T. Leighton ... ... ... | | 381,200 |
| Engraving and Chasing Machine. John A. Coburn ... ... | | 381,214 |
| Mainspring for Watches. Frederick Sedgwick .. ... ... | | 381,176 |
| Means for Bevelling Watch Wheels. H. Hugnenin ... ... | | 381,785 |
| Metallic Alloy. H. Ostermann and Axel Prip ... ... ... | | 381,718 |
| Metallic Alloy. H. Ostermann and Charles Lacroix ... ... | | 381,719 |
| Opera, Field, and Marine Glass. Geo. H. Eaton... ... ... | | 381,347 |
| Recording Thermometer. Daniel Draper ... .. ... ... | | 380,872 |
| Soldering Iron. Carl R. Danielson ... ... ... ... ... | | 381,533 |
| Soldering Pliers. Owen F. Garvey ... ... ... ... ... | | 381,544 |
| Stem Winding and Setting Watch. Joel N. Whipple ... ... | | 381,601 |
| Stem Winding and Setting Watch. Walter D. Davies... ... | | 381,219 |
| Watch Balance. P. W. Rohde ... .. .. ... ... ... | | 380,769 |
| Watch Protector. Julius Debrinke... ... .. ... ... | | 380,869 |
| Winding and Setting Attachment for Clocks. John Zelly ... | | 381,603 |

A printed copy of the specifications and drawing of any patent in the American list, also of any American patent issued since 1866, will be furnished from this office for 2s. 6d. In ordering, please state the number and date of the patent required, and remit to J. TRUSLOVE, Office of *The Watchmaker, Jeweller and Silversmith*, 7, St. Paul's Churchyard, E.C.

## Correspondence.

*All Letters for Publication to be addressed to the* EDITOR *of* THE WATCHMAKER, JEWELLER AND SILVERSMITH, *7, St. Paul's Churchyard, E.C.*

*All communications must bear the name and address of the sender, not necessarily for publication, but as a guarantee of good faith.*

TO THE EDITOR OF *The Watchmaker, Jeweller and Silversmith.*

DEAR SIR,—By this post I send a report of some criminal proceedings, that I venture to think may interest many of your wholesale, as well as retail trading readers. I shall therefore be glad if you will kindly publish a condensed report in your next issue. I may mention that I have actually lost from my stock, goods that have cost me nearly £200. Thanking you in advance,

I am,
Yours faithfully,
J. D. FISHER.

P.S.—The jury were mis-directed: I had no knowledge or even suspicion that such sales as these were going on.

## Buyers' Guide.

# INDEX TO VOLUME XIII.

# RESULTS OF WATCH TRIALS AT THE KEW OBSERVATORY.

## Extract from the Reports of the Kew Committee of the Royal Society.

The following obtained the highest number of Marks, with Class A Certificates, during the years ending October 31st:—

| 1885. | | 1886. | | 1887. | |
|---|---|---|---|---|---|
| E. F. ASHLEY ... ... ... | 86·1 Marks. | E. F. ASHLEY... ... ... | 86·7 Marks. | JOS. WHITE ... ... ... | 88·1 Marks. |
| KULLBERG ... ... ... | 84·4 „ | BAUME & CO. ... ... | 84·1 „ | BAUME & CO. ... ... ... | 85·1 „ |
| BAUME & CO. ... ... ... | 83·2 „ | PARKINSON & FRODSHAM | 83·6 „ | W. HOLLAND ... ... ... | 83·1 „ |
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The highest number of Marks obtained by Complicated Watches during the 3 years ending October 31st, 1887, are as follows:—

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| Split Seconds Chronograph by BAUME & CO., awarded ... .. | 85·1 Marks. |
| Chronograph by - - - BAUME & CO., awarded ... ... | 81·0 „ |
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## ALBO SILVER.

"THE white alloy, registered under the name of 'ALBO SILVER,' which we called attention to in our notice of the British Association Exhibition, is, we learn, in great demand throughout the trade. It is peculiarly suitable for the manufacture of chains and jewellery, as it has the whiteness of grain silver, without a tinge of the yellow or leady colour generally characteristic of alloys of this kind. Indeed so highly was it reported on by the authorities of Mason College in this respect, that at their request samples in ingot and in a manufactured state were permanently deposited in the museum of that institution. The chains manufactured of this material are especially good, and are made up in a very saleable manner, either loose or on a very pretty registered pad. They are on sale by all wholesale houses. Each article has a registered 'ALBO SILVER' label attached, and as a guarantee of quality the makers' initials N.C.R.Co. is stamped on every swivel."—*The Watchmaker, Jeweller and Silversmith.*



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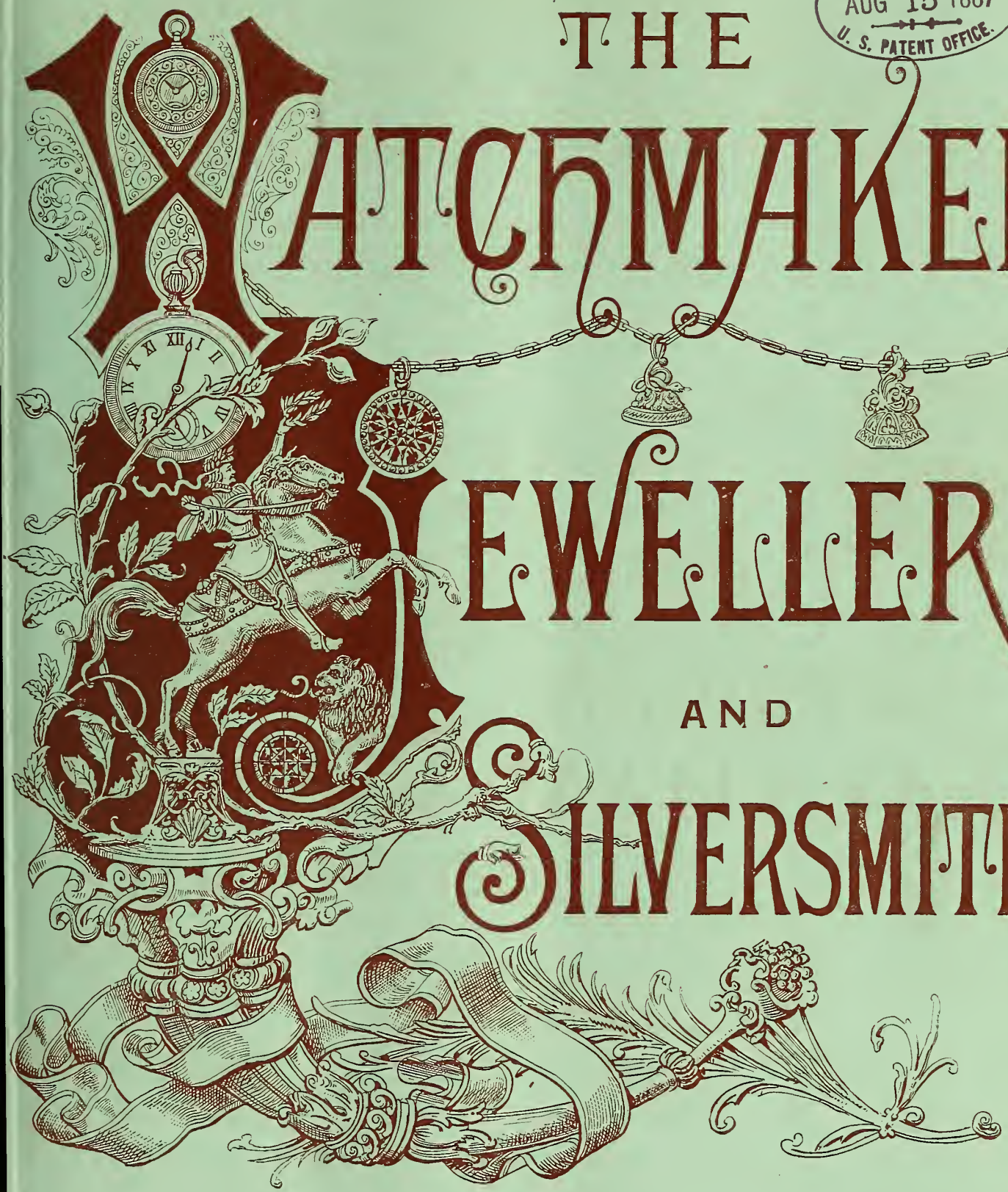
Printed for the Proprietors by HUTCHINGS & CROWSLEY, Limited, Henry Street, St. John's Wood, in the Parish of St. Marylebone; Published by A. J. NIGHTINGALE, Imperial Buildings, Ludgate Circus, London, E.C.; the Trade supplied by W. FOULSHAM & Co., 4, Pilgrim Street, London, E.C.—*July 1, 1887.*

VOL. XIII. NO. 2.] AUGUST 1, 1887. [SUBSCRIPTION 5s. PER ANNUM. POST FREE.



# THE WATCHMAKER JEWELLER AND SILVERSMITH



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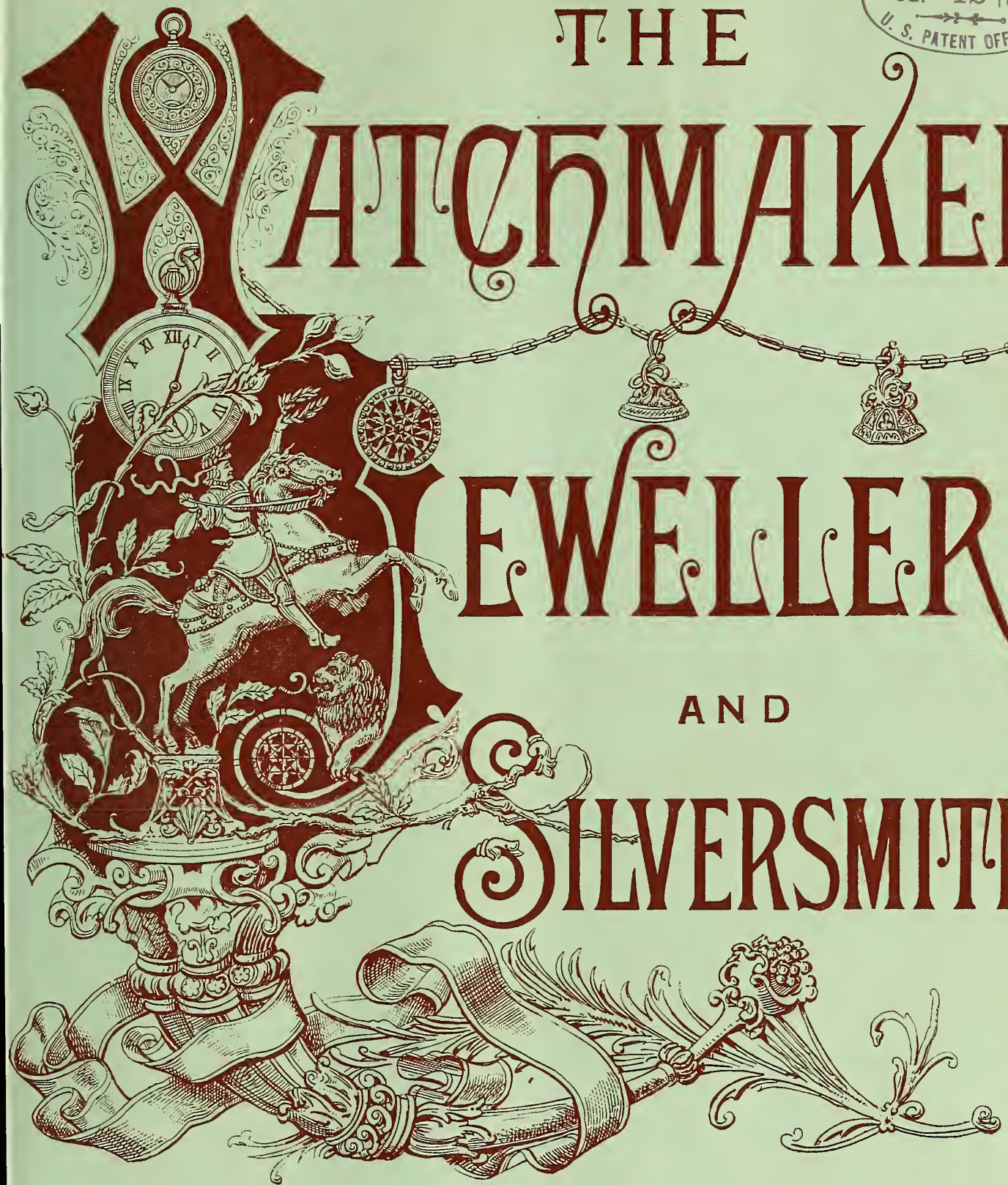
VOL. XIII. NO. 3.] SEPTEMBER 1, 1887. [SUBSCRIPTION 5S. PER ANNUM. } POST FREE.



# THE WATCHMAKER JEWELLER AND SILVERSMITH



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LONDON, E.C.

# NORTH BRITISH AND MERCANTILE INSURANCE COMPANY.

Established 1809.

*Incorporated by Royal Charter and Special Acts of Parliament.*

## RESOURCES OF THE COMPANY.

*As at 31st December, 1886.*

| | | |
|---|---|---|
| I. CAPITAL—AUTHORISED CAPITAL - - - | £3,000,000 | 0 0 |
| SUBSCRIBED CAPITAL - - - - | 2,500,000 | 0 0 |
| PAID-UP CAPITAL - - - - | 625,000 | 0 0 |
| II. FIRE FUND—RESERVE - - - - - | £1,250,000 | 0 0 |
| PREMIUM RESERVE - - - - | 380,910 | 0 6 |
| BALANCE CARRIED FORWARD - - | 107,997 | 6 0 |
| | £1,738,907 | 6 6 |
| III. LIFE FUND—ACCUMULATED FUND (Life Branch) | £3,645,719 | 0 0 |
| Do. do. (Annuity Branch) | 607,635 | 13 9 |
| | £4,253,354 | 13 9 |

## REVENUE FOR THE YEAR 1886.

| | | |
|---|---|---|
| From the LIFE DEPARTMENT. | | |
| Net Life Premiums, Interest, &c. - - - | £488,932 | 9 2 |
| Annuity Premiums (including £86,165 9s. by single payments) and Interest - - - | 112,503 | 12 6 |
| | £601,436 | 1 8 |
| From the FIRE DEPARTMENT. | | |
| Net Fire Premiums, Interest, &c. - - - | 1,231,960 | 1 7 |
| | £1,833,396 | 3 3 |

*The Accumulated Funds of the Life Department are free from liability in respect of the Fire Department, and in like manner the Accumulated Funds of the Fire Department are free from liability in respect of the Life Department.*

## LIFE DEPARTMENT.

*NINE-TENTHS OF THE WHOLE PROFITS OF THE LIFE ASSURANCE BRANCH ARE ALLOCATED TO PARTICIPATING POLICIES.*

The last division of Profits was made as at 31st December, 1885, when there was declared a Bonus of **£1 9s. per cent. per annum** on the Sums Assured and subsisting Bonus Additions.

Although the Bonus is at the rate of £1 9s. per cent. per annum on the Sums Assured by the Policies of this Company effected since last Investigation, it is much higher on Policies of older standing, in consequence of the Bonus being declared not only on the original Sum Assured, **but also on all subsisting Bonus Additions.**

**The Bonus declared in 1881 was £1 7s. 6d. per cent. per annum.**

*IMPORTANT FEATURES.*—Claims paid on proof of death and title. Premiums adjusted to each half-year of age. Minimum Surrender Values fixed, and held at credit of Insured for five years. Paid-up Policy of liberal amount granted in place of lapsed policy, if desired within six months. Inaccurate statements in proposal papers do not involve forfeiture of Policy unless accompanied by fraud. Policies in most cases are free from all restrictions as to occupation, residence and travel.

*ANNUITY BRANCH.*—Annuities, Immediate, Contingent or Deferred, are granted on favourable terms.

## FIRE DEPARTMENT.

Property of nearly every description insured at Home or Abroad at the Lowest Rates of Premium. **Losses promptly and liberally settled.**

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No. 7 - - 3s. 9d. doz.
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**DIAMOND RINGS**
*Mounted in 15ct. H.M. Gold.*


*No. 82 - 10s. 6d.*


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ALSO IN MANY OTHER PATTERNS.

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*For Cash or allowed for, as wished.*
SILVER, SUBJECT TO MARKET - - 3/6 oz.
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*IN ALL NEWEST DESIGNS.*

Silver Vesta, Cigar, Cigarette and Card Cases, Napkin Rings, Thimbles, Pencil Cases, all sorts of Studs, Solitaires and Links; Buffalo Horn, Silk, Glass, Steel, Nickel and Black Chains, for Ladies and Gentlemen.

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Silver Cases, Metal Domes - 9/-
„ Silver „ - 10/3
„ English Hall-marked, fully jewelled - 11/3

**GENT'S ALBERTS,**
*Hall-marked on every Link.*
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9 ct. Gold - - - 40/- „
FASHION INCLUDED.

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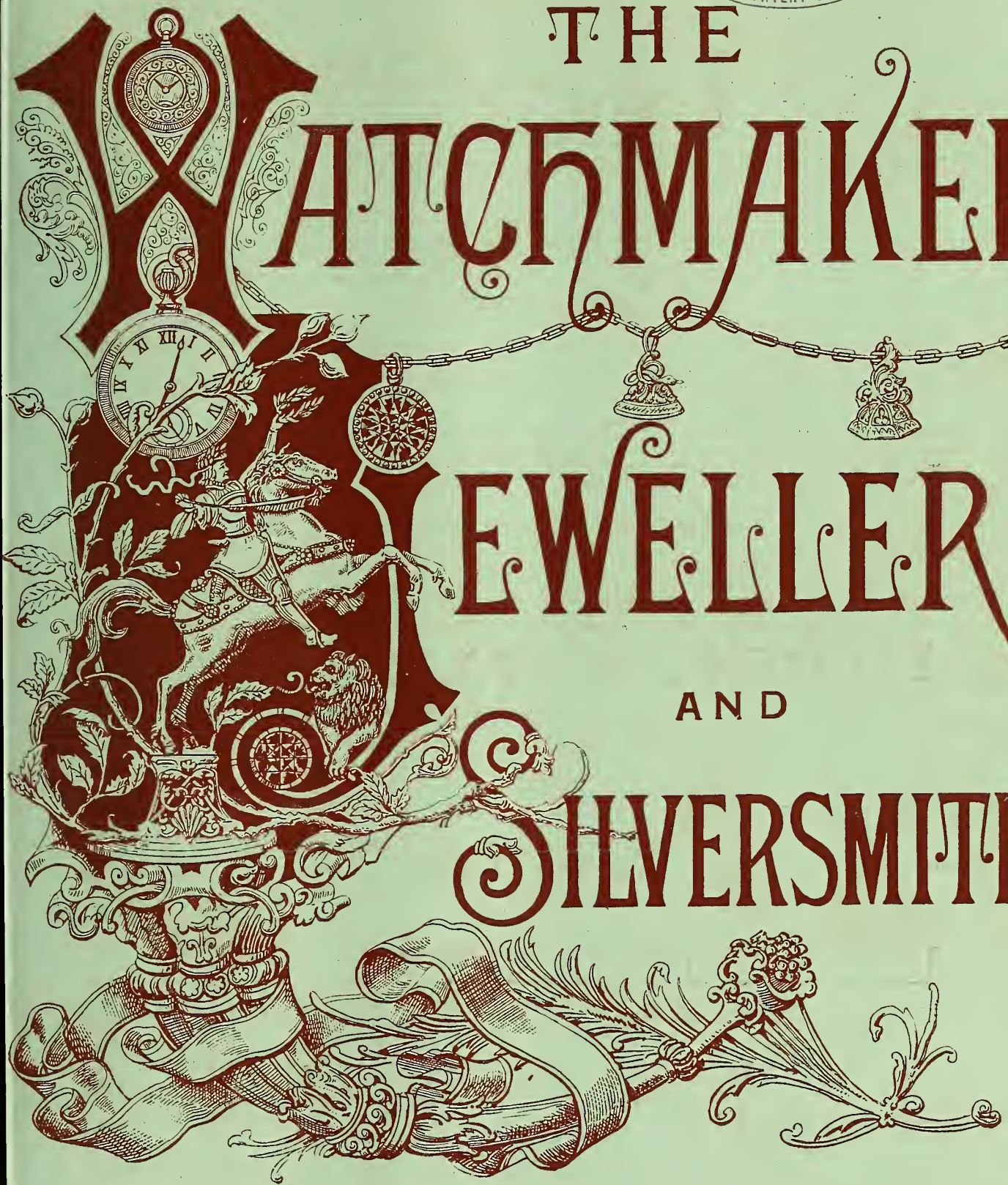
# THE WATCHMAKER JEWELLER AND SILVERSMITH



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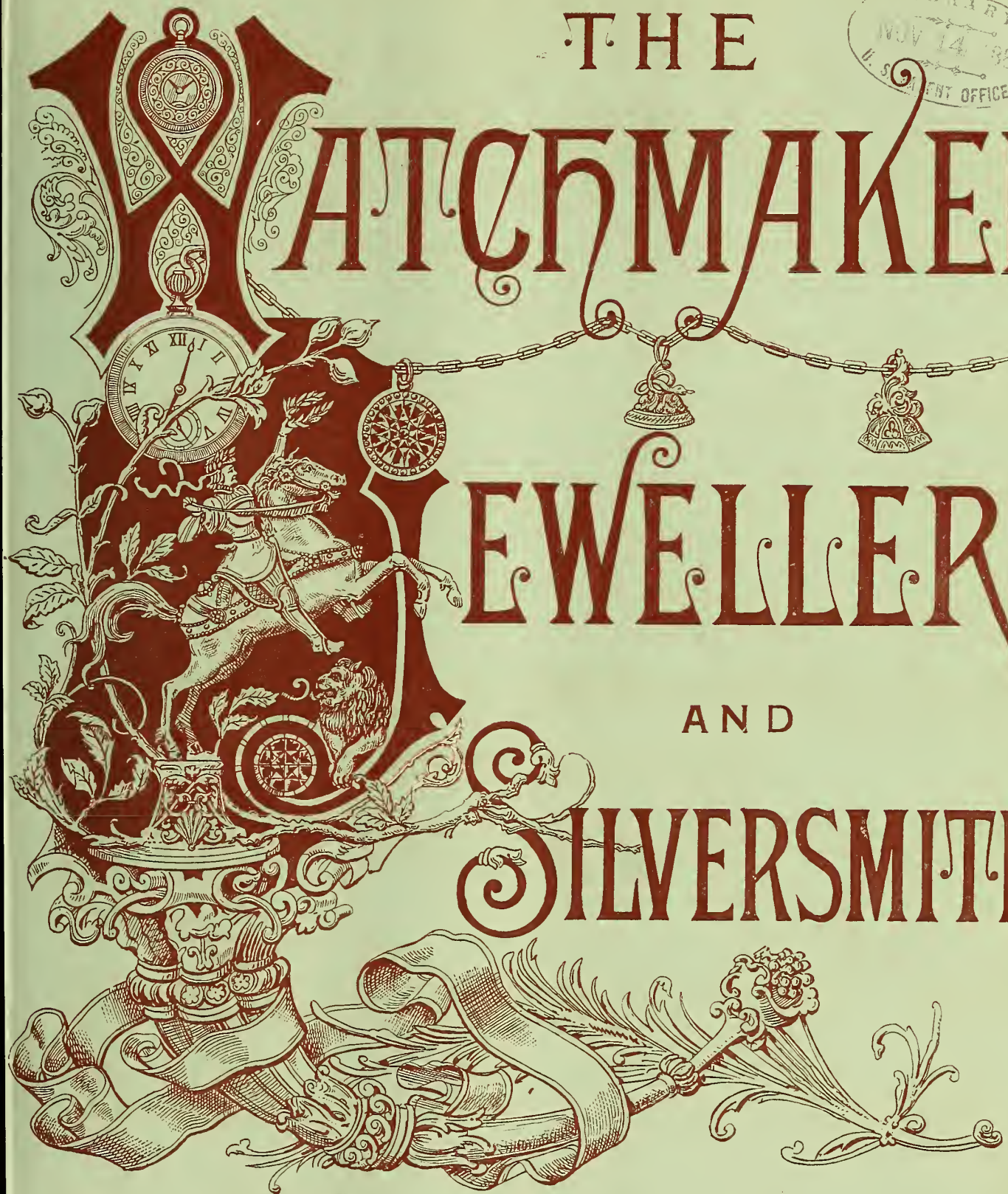

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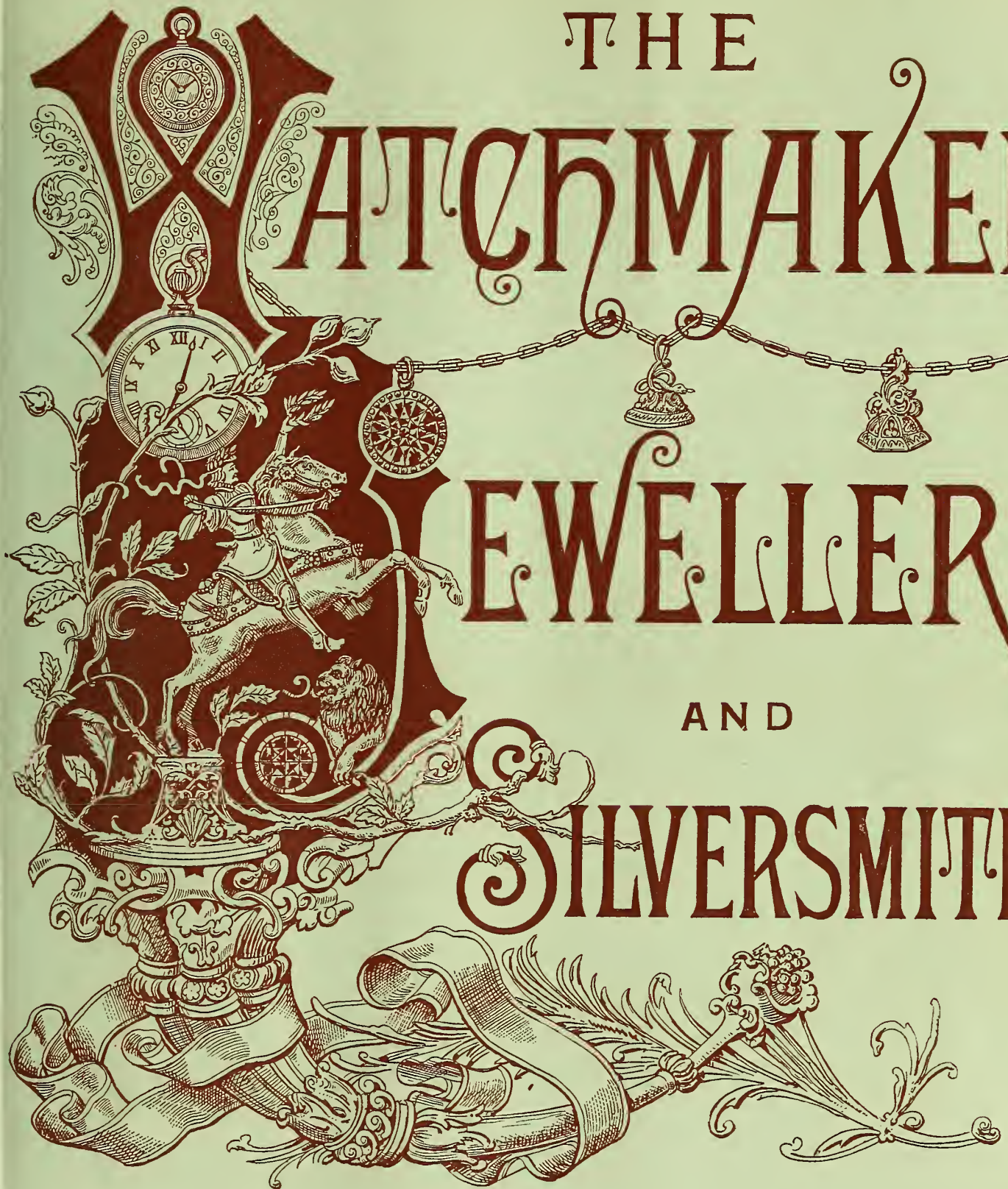

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SPECIMENS OF THE CLASS OF WATCHES MANUFACTURED BY C. H. GOLAY, WHICH HAVE BEEN AWARDED CLASS A CERTIFICATES AT THE KEW OBSERVATORY TRIALS.

THESE WATCHES HAVE ALL BEEN SPRUNG BY J. F. COLE.

| CLASS A. | No. of Marks |
|---|---|
| Keyless minute repeater ... ... ... ... | 64 |
| Keyless minute repeater clock-watch ... | 74.9 |
| Keyless minute repeater ... ... ... ... | 73 |
| Keyless half-quarter repeater ... ... | 64.8 |
| Keyless minute repeater, minute chronograph ... ... ... ... ... | 71.6 |
| Keyless minute repeater ... ... ... ... | 75.7 |
| Keyless minute repeater ... ... ... ... | 76.2 |
| Keyless minute repeater ... ... ... ... | 78.3 |
| Keyless fly-back minute chronograph ... | 68 |
| Keyless fly-back chronograph minute repeater ... ... ... ... ... ... | 60.6 |
| Double fly-back keyless chronograph ... | 50.0 |
| *Keyless minute repeater, minute chronograph, perpetual calendar watch ... ... ... ... ... | 69.5 |
| Keyless minute repeater ... ... ... ... | 73.1 |
| Keyless minute repeater ... ... ... ... | 65.8 |
| Keyless minute repeater clock-watch ... | 75.3 |
| Keyless ¾-plate ... ... ... ... ... ... | 64.9 |
| Keyless minute repeater, perpetual calendar, clock-watch ... ... ... | 65.7 |
| Keyless ¾-plate ... ... ... ... ... ... | 68.4 |
| Keyless minute repeater, perpetual calendar ... ... ... ... ... ... | 76.3 |
| *Keyless minute repeater, perpetual calendar, minute and second chronograph ... ... ... ... ... | 71.3 |
| Keyless ¾-plate ... ... ... ... ... ... | 63.3 |

**ESPECIALLY GOOD A.**

*Keyless minute repeater clock-watch ... 78.7 Marks.* This is the only Clock-Watch which has ever gained an "Especially Good" Class A Certificate.

* *These are the only Watches of their kind which have ever gained Class A Certificates.*

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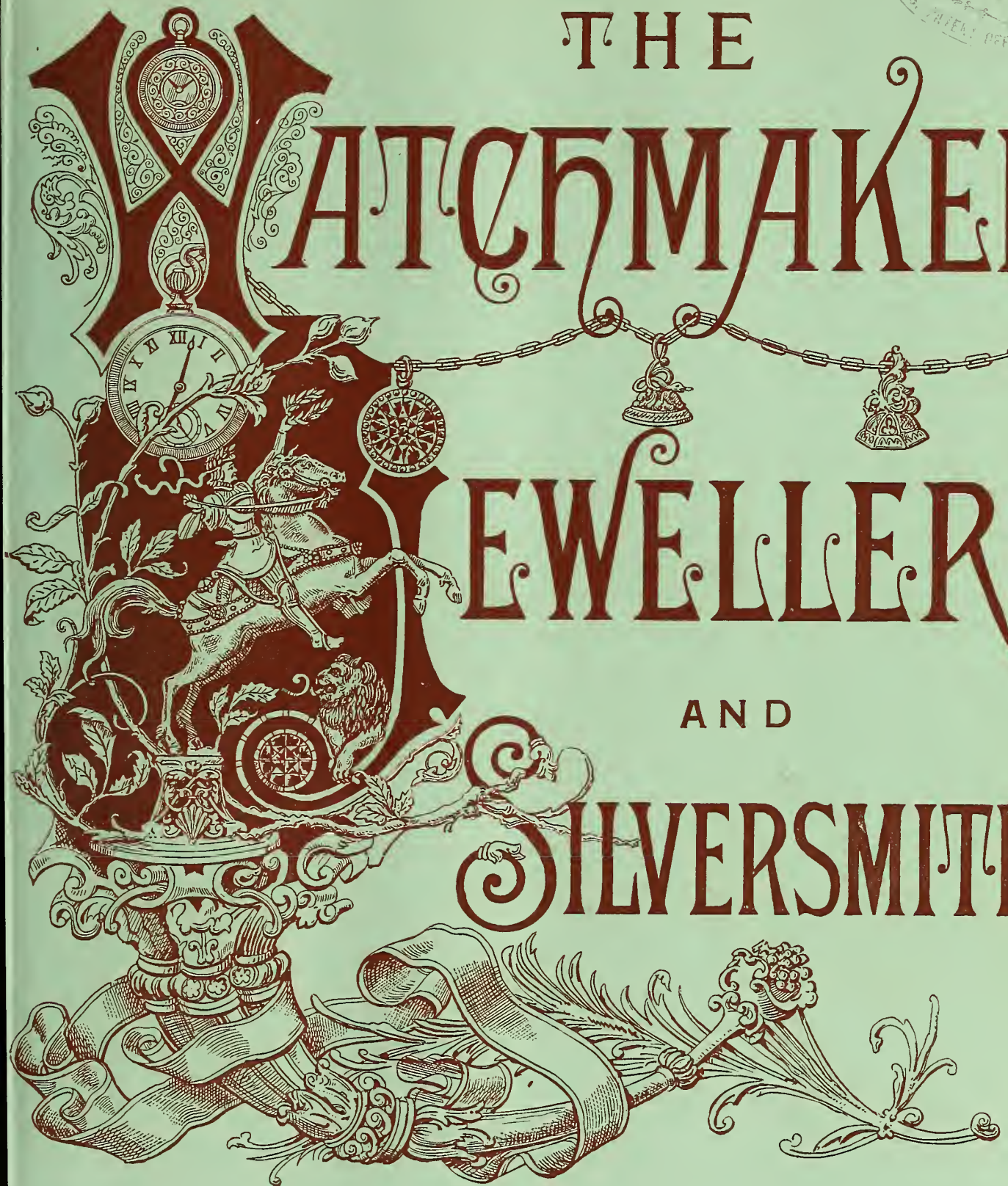

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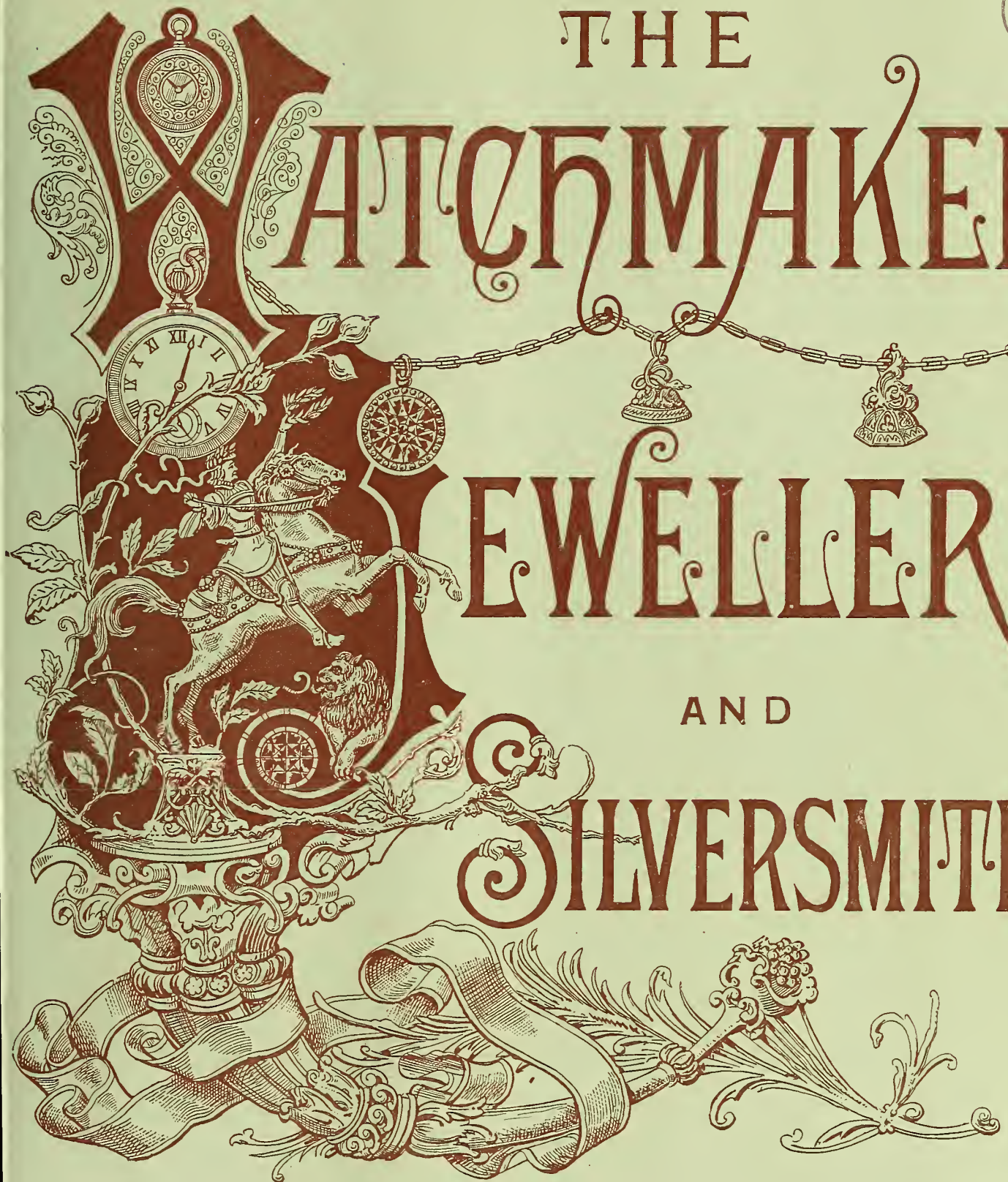

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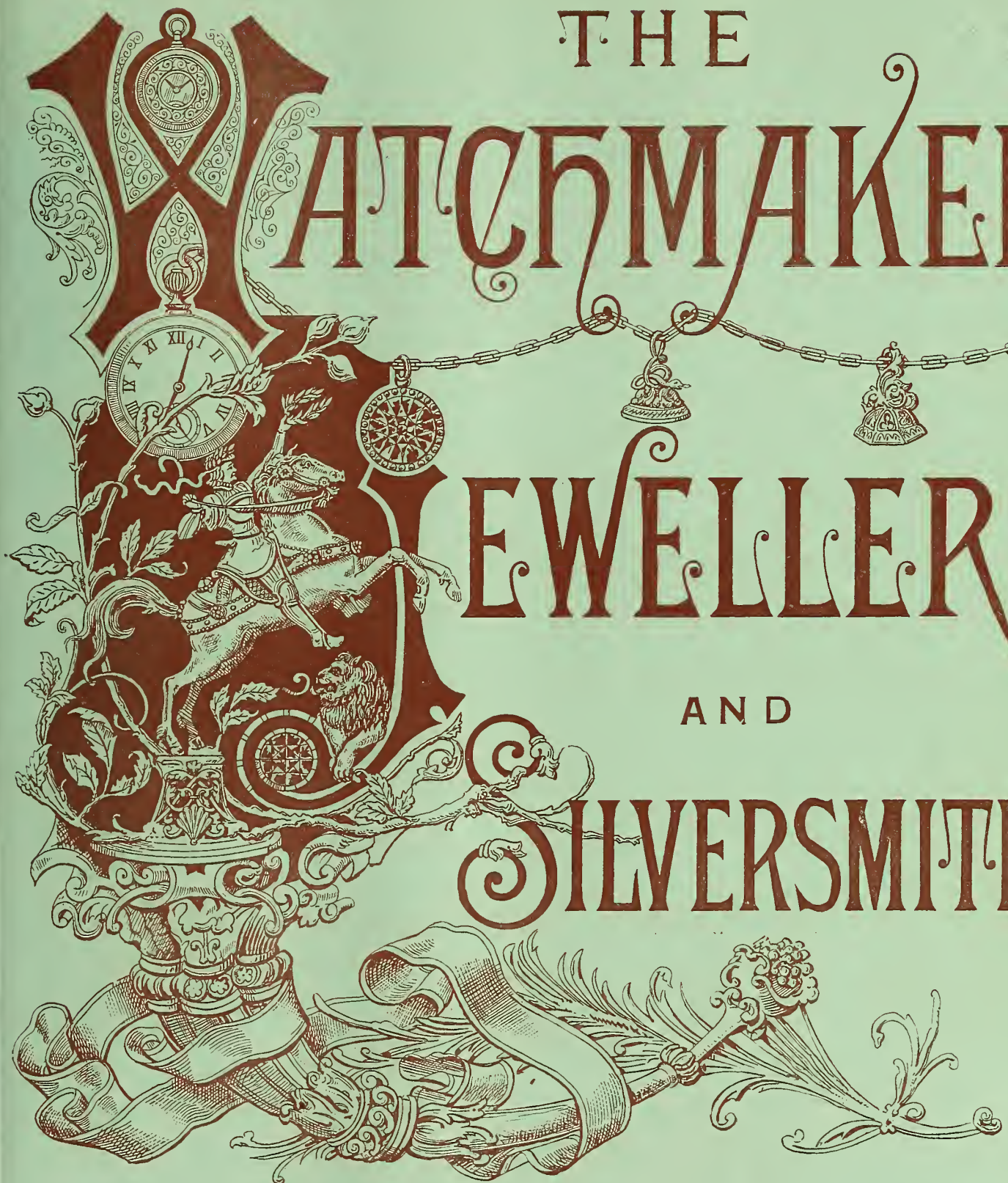

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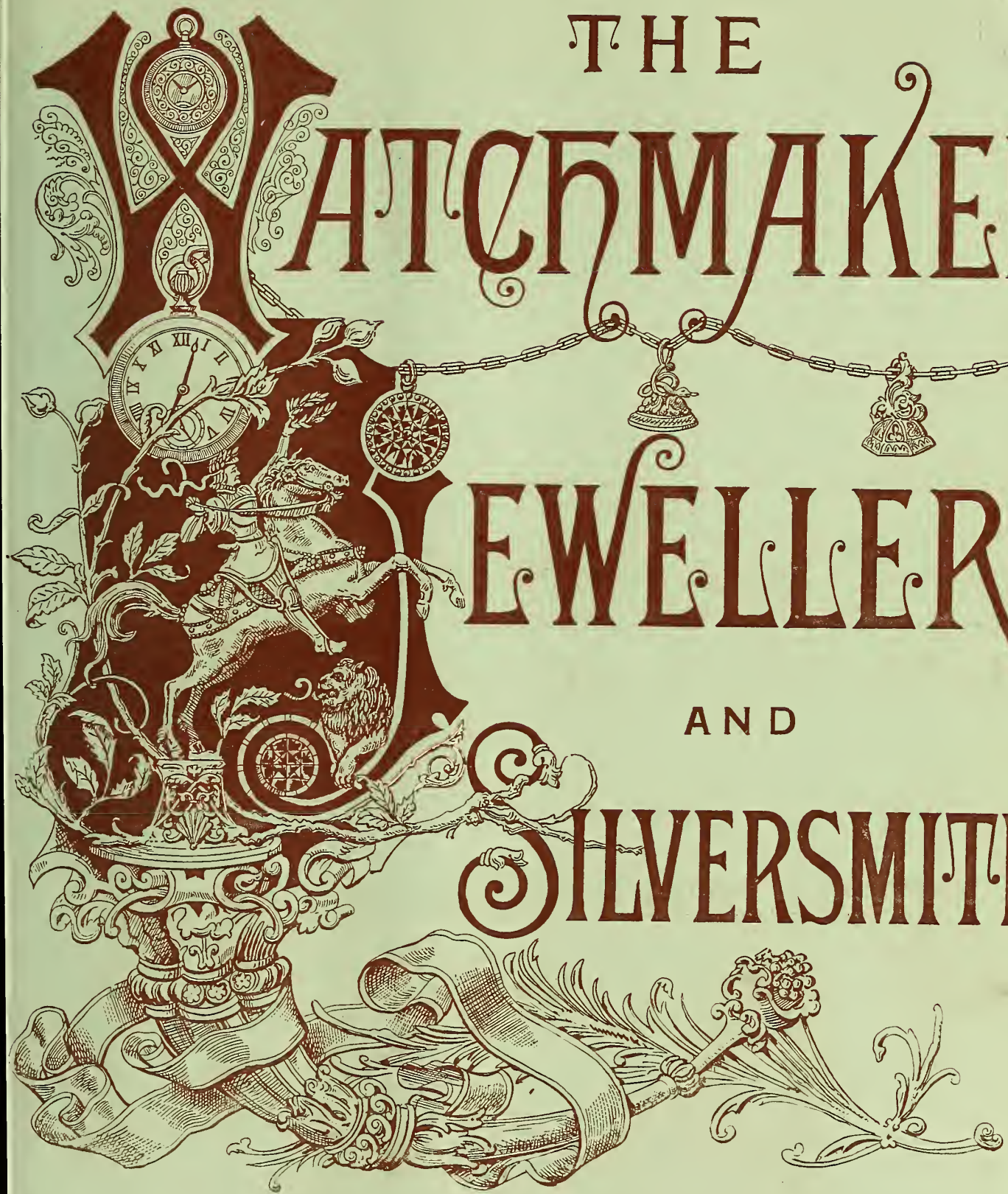

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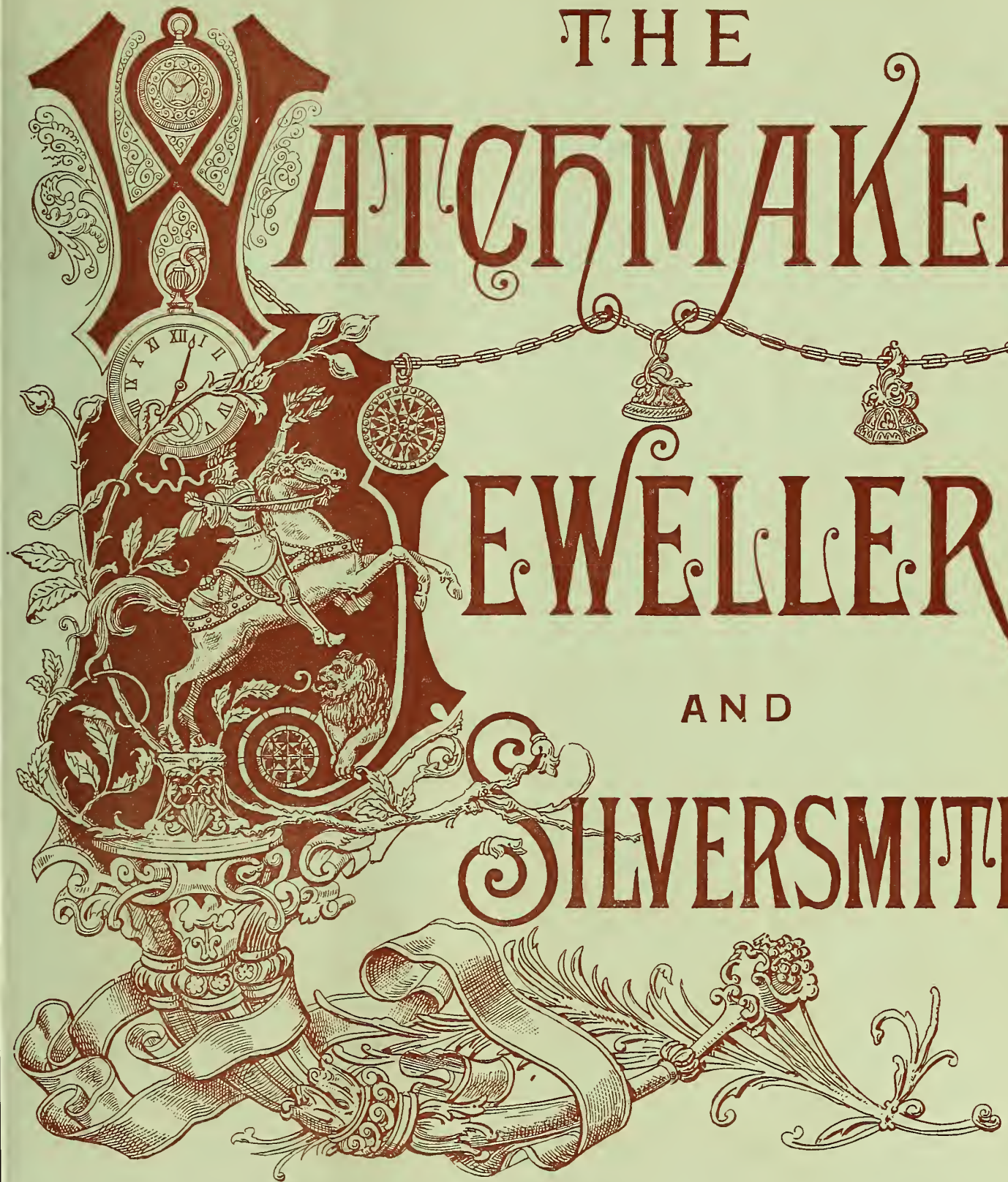

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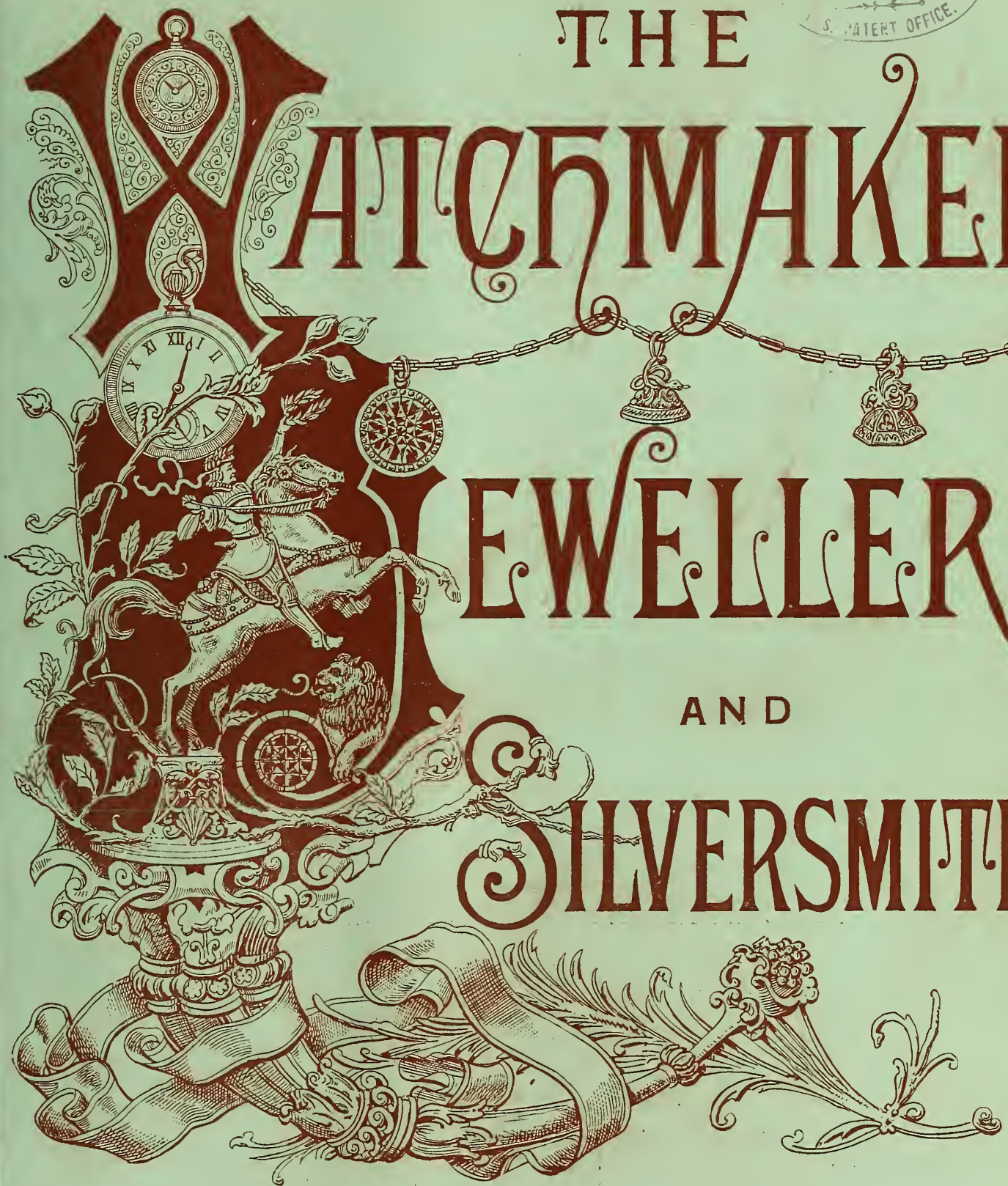

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