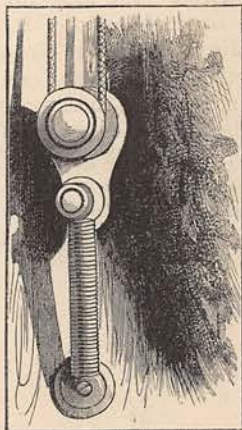


THE GATHERER: AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.

Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article submitted.

An Ingenious Blind Rack.



An ingenious little blind rack has recently been patented, and is illustrated in the accompanying woodcut. The bottom plate of the rack is secured to the frame of the window by a screw, round which is also fastened the ringed end of a spring. A corresponding ring at the other end of the spring is slipped over a knob immediately below the pulley. In use the rack is so placed that the head of the pulley shall fall a little short of the loop of the cord which is to go round it, so that when the spring is stretched to meet it the cord is held firmly. Owing to the elasticity given by the spring, there is no straining of the cord to secure tightness; and when it is necessary to take down the blind, all that is required is to stretch the spring a little more than usual, and so release the cord. The pulley and bottom plate of this new rack are made of earthenware in every variety of tint and decoration.

A Simple Knife-Cleaner.

A new knife-cleaner for table-knives has recently been introduced. It consists of two boxes of cleaning powder attached to one another by a hinge, and having two pads of felt sandwiched between them. The knife is placed between these two pads and drawn quickly backwards and forwards, when the polishing powder percolates through to the pads and so cleans the blade.

Writing on Glass.

A new ink for writing on glass, brought out in America under the name of "diamond ink," has been analysed at the request of Professor Maisch, and found to contain ammonium fluoride, barium sulphate, and sulphuric acid. It is used with an ordinary pen, and is said to be useful for labelling bottles containing substances apt to destroy common labels. It is made by mixing barium sulphate 3 parts, ammonium fluoride 1 part, and a sufficiency of sulphuric acid to decompose the ammonium fluoride and make the mixture semi-fluid. The ink is contained in a glass bottle thickly coated outside with asphaltum, and inside with beeswax. It is stoppered with an india-rubber stopper. The ink should be prepared in a leaden dish, and is preferably kept in a bottle of lead

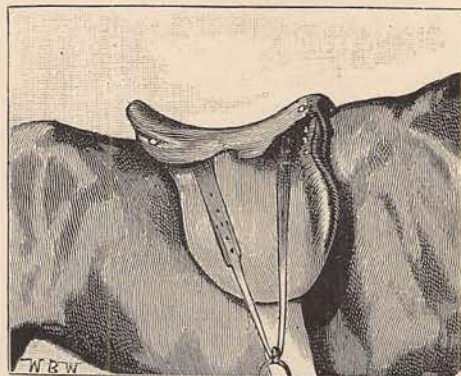
or gutta-percha; but it can be kept in a glass bottle if its inside is coated with paraffin wax, rubber, or beeswax.

A Time-Checking Clock.

A clock for checking the arrival and departure of workmen has recently been brought out. Below the clock is a tube about fifteen inches long, and each workman drops his check into it, and at suitable intervals, say every five minutes, the clock causes a time-check to fall amongst these and take its place in the vertical pile of checks. This is done by making the clock rotate a disc with slits in it, which drop the time-checks at regular intervals. It is thus easy to see the time at which workmen bearing their numbered checks have dropped them in. If a workman should drop in a comrade's check as well as his own, and the absence of that comrade be observed, the confederate can be ascertained by reason of the fact that his check will be next to that of the absent comrade for whom he acted.

Black Gold.

"Black gold," as it is called, is found in the famous "Nuggety Reef" of Maldon, Victoria. It occurs in granite veins in the quartz of the reef. According to a recent chemical examination, it is when fresh of a crystalline silvery-white appearance, but becomes black on exposure to the air. It is in reality a natural alloy of gold and bismuth, and when properly refined it yields a head of gold.



A Safety Saddle.

The figure shows a new saddle which has been brought out recently. One notable feature in it is the provision of a soft yielding seat between the pommel and cantle of the saddle. Another is the way the stirrups are hung from two points of the saddle on both sides, as shown. These improvements are

claimed to allow the rider to sit closer to his horse, and to bring the open front of the stirrup to the forward thrust of his foot.

A Built-up File.

The figures show a new file which is built up for use. It consists of a set of serrated plates held together by a nut and screw, and capable of being taken down and sharpened on a grindstone when they are blunted.



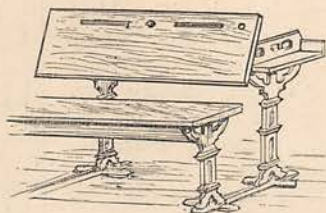
This avoids the necessity of re-cutting in the ordinary way. The serrated plates are threaded on a steel bar, as will be seen from Fig. 1, which represents a section through a file. They are tightened on by the insertion of a thin steel strip along the bar. This file is stated to last much longer than the ordinary file, and, although more expensive at first, is said in the end to be cheaper than the latter. Fig. 2 shows the file in front view.

Paper from Bamboo.

It almost seems as though good serviceable paper can be made from every kind of vegetable fibre. Grasses and woods of all sorts, and even peat, have been brought into requisition, while one of the latest introductions is crushed bamboo, which has been used with very satisfactory results.

A Great Balloon.

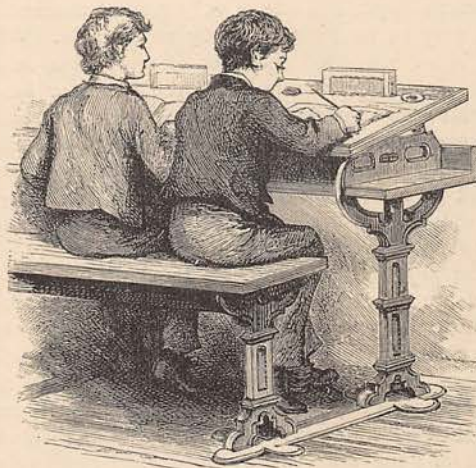
The captive balloon of M. Yon, which is intended to be a feature of the Paris Exhibition of 1889, will have the enormous volume of 60,000 cubic metres. The maximum altitude of the ascensions will be 1,000 metres. The car will be able to hold a hundred persons, and a winding machine of 600 horse-power will be employed to raise and lower it. To keep the balloon well inflated it will contain a smaller one filled with air, and capable of being increased or diminished in volume by means of an air-pump worked by an electric motor on the car, the current being supplied by wires along the cable of the balloon from a generator on the ground.



A Convertible School Desk.

A school desk having a slot for slates, a book-board, and so on, while being capable at the same

time of conversion into a seat with a back to it, is illustrated herewith. The desk is readily converted into a backed seat, without changing its position, for evening lectures and demonstrations. All the desks



in a large school can be converted in a few minutes, and without turning them round. The four positions which the desk can be altered to are a sloping desk, a flat desk, a backed seat facing in the same direction as the desk, and a backed seat facing in the opposite direction. The desk is made of pitch-pine, well varnished.

The Tintometer.

This is the name of a new instrument designed to measure the depth of colour in liquids and solids. It consists of two tubes 18 inches long, open at their ends, and placed side by side. In one tube is placed the liquid to be examined, and in the other a series of coloured glasses, with which the comparison of colours is to be made. Both of the tubes are viewed through a single eye-piece. The glasses are arranged in a definite scale of colour so that the precise tint can be determined.

Mind Magic.

To the Editor of CASSELL'S MAGAZINE.

SIR,—In the March number of this MAGAZINE appeared an article under the above heading, the author of which puts forward the theory that a subtle force called Od permeates all nature, and exercises a mysterious influence over things animate and inanimate. By this force he claims to account for various popular beliefs and superstitions, such as the evil eye, love at first sight, the fascination of snakes, the mystery of the divining rod, &c., and professes to prove his theory by certain experiments, some of which he describes. Now, we do not profess to be able to offer a complete explanation of all of these phenomena, and we do not deny that "there are more things in heaven and earth than are dreamt of in our philosophy;" but we do deny that the movements of what is called the odometre, or divining ring, depend

on aught else than the operation of well-known physical and physiological laws, and we think that the experiments we have made lead to a conclusion different from that come to by Mr. Day.

The physiological law on which the motions of the odometre depend is one of very general application, and may be best illustrated by an example. When one is an interested spectator of any action on the part of another, the mind of the spectator has in general such an effect over his body as to cause him to move in sympathy with the action he is watching; for instance, when a jumping competition is going on, it will be noticed by a careful observer that many of the onlookers will raise one foot just at the moment that each competitor makes his jump.

The physical laws on which these phenomena depend are the laws of the simple pendulum, and, as an illustration, we may take the case of a large bell, which may be rung by a mere boy if he applies his strength in the right way. A single pull on the rope will not swing the bell to its full extent, but will cause a slight backward and forward motion which will continue for some time. Now, if a second pull is given at the moment that the first, or some succeeding oscillation, is complete, the second small impulse is added to the first and a larger swing is produced; a third and fourth pull produce corresponding effects, and ultimately, by means of a great number of insignificant impulses, a great final effect is produced, and the heavy bell swings to and fro through a large arc.

The following extract from Helmholtz' "Sensations of Tone" will show how the foregoing physiological and physical laws will account for the ring taking any motion previously expected.

"A similar experiment, which can be tried at any instant, is the following. Construct a pendulum by hanging a heavy body (such as a ring) to the lower end of a thread, holding the upper end in the hand. On setting the ring into pendular vibration, it will be found that this motion can be gradually and considerably increased by watching the moment when the pendulum has reached the greatest departure from the vertical, and then giving the hand a very small motion in the opposite direction. The displacements of the hand may be so small, under the circumstances, that they can scarcely be perceived with the closest attention, a circumstance to which is due the superstitious application of this little apparatus as a divining rod. If, namely, the observer, without thinking of his hand, follows the swings of the pendulum with his eye, the hand readily follows the eye, and involuntarily moves a little backwards or forwards, precisely in the same time as the pendulum, after this has accidentally begun to move."

On trying the experiments detailed by Mr. Day, we found that the motions he describes were at first faithfully executed by the odometre, but on applying crucial tests the result was altogether different. These may be divided into three groups:—

I. The operator held the ring in the requisite position for one motion, but fixed his mind on some other; the ring took the latter motion.

II. The operator was blindfolded; the motions were feeble and uncertain.

III. The operator was ignorant of the motion that the ring was supposed to take; the motions were decided, but not according to the rule.

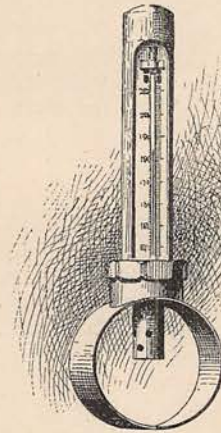
Our conclusion, then, from these experiments and the theoretical considerations before mentioned, is this—that the motions are produced by the influence of the mind upon the small pendular vibrations set up by the trembling of the hand, and not directly by any magnetic or other similar force.

In conclusion, we desire to thank Mr. Day for the pleasure afforded us by the reading of his undoubtedly interesting article, and

We remain, yours very truly,

THOMAS FARRINGTON, M.A., F.C.S.
STEPHEN FOREMAN.

An Adjustable Thermometer.



Thermometers are known to alter with time; and Mr. Andrew Haddon has devised the plan for adjusting their zero which is illustrated in the figure. In this apparatus the thermometer tube is fastened at one end to a separate piece which can slide in the scale, so as to enable any one to adjust his instrument so as to agree with a standard thermometer, or with any other in his possession. The figure shows one of Mr.

Haddon's instruments fitted in its protective case.

A Giant Crystal.

At the Royal Jubilee Exhibition at Manchester a crystal of alum, believed to be the largest ever made, is on view. It stands twelve feet high, and is about six feet in diameter. The alum is said to be of the finest quality.

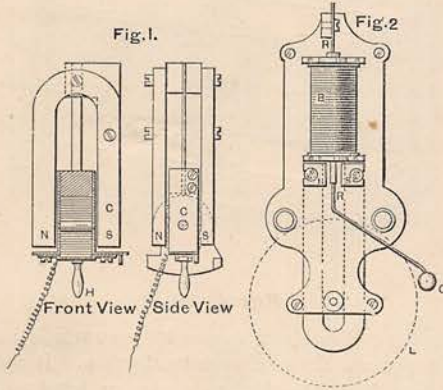
A New Belt Joint.

A new method of jointing belts is shown in the accompanying sketch, which will explain itself. The object of the method is to produce a strong and durable joint without riveting or stretching in the ordinary way. After cutting the ends in the required form, as shown, cement is applied to the sides, and the joint is made. It is advisable that the belt should run in the direction of the arrow, when the machinery is going, so as to prevent the edges of the laps from coming into contact with any possible obstruction.



A Magneto-Electric Bell.

In electric house-bells it is frequently the battery which gets out of order, thus interfering with the working of the system. In the new magnetic bells which we illustrate herewith, no battery is used; the bell generating its own electricity by the act of pulling the bell-pull. Fig. 1 is the portion of the bell which



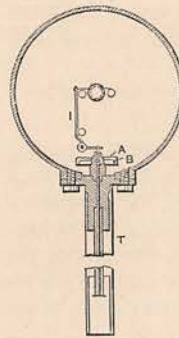
generates the current, and Fig. 2 the actual bell which rings when the current traverses it. In Fig. 1, N S is a strong double horse-shoe magnet, between the four poles of which, N S, is suspended a bobbin, or bobbins, of insulated wire, C, which are connected in circuit with the line. A handle, H, the bell-pull, is attached to the bobbin, which is suspended by a spring, so that when the handle is sharply pulled and let go, the bobbins vibrate in the magnetic field between the poles of the magnets, and generate a current of electricity which traverses the line wire to the electric bell shown in Fig. 2. This consists of a solenoid or hollow bobbin of wire, B, having an iron core passing through its middle. This core is carried by a spring, R, at its upper end, and at its lower end is free to vibrate between the poles of a magnet, N S. It is "polarised" magnetically, so that when the alternating currents in the line coming from the magneto generator (Fig. 1) traverse the bobbin, B (Fig. 2), the core vibrates between the poles of the magnet, N S (Fig. 2). The core carries a clapper, C, which hits the bell, L, at every vibration. Thus the pull on the handle, H (Fig. 1), causes the clapper, C (Fig. 2), to strike the bell. We have only described one variety of this invention; but there are others, designed for railway stations and large establishments, made on the same principles.

A Water Spy-Glass.

The mother-of-pearl divers of the Red Sea have taken to the use of a simple spy-glass for seeing the pearl-shells on the bottom of the sea. It consists of an empty tin, such as are common now, with a pane of glass fitted to its bottom. The box thus made is partly submerged bottom downward, and the diver looks through the glass end at the sea-bottom. The device enables him to look through still water untroubled by the surface ripple. A similar device is

also used to look at the "sea gardens" of the coral reefs in the Bahamas and other West Indian islands. It might be useful to collectors and others at home. In connection with the mother-of-pearl fisheries, we may mention that those of the Red Sea, according to a recent consular report, are carried on chiefly by black slaves, who take two-thirds of the profits, leaving one-third to the owner of the boat. The best shells are the *Shama-i*; the worst the *Yeman*, both found on the Arabian coast. The shells, after being cleaned, are packed in barrels for export. Some go to Trieste, some to Havre, and some to London. Others go to Bethlehem, where they are carved and sold to pilgrims.

A New Pyrometer.



In this apparatus the expansion of mercury or other liquid by heat is caused to act on two thin metal plates, A, B, in the figure, and the motion thus obtained is caused to indicate the temperature. The body whose temperature is to be measured is put in connection with the lower plate, B, by means of the metal tube, T, seen below; and the motion of the upper plate, A, due to the expansion of the liquid between the plates, is communicated

by means of a lever arrangement to an indicator, I. This indicator may take the form of an electric alarm, as sketched in the figure. When a given temperature has been reached the alarm will be sounded.

Making Fine Glass Fibres.

A novel process of making glass fibres of extreme tenuity has been devised by Mr. C. Vernon Boys. It consists of a bow shooting a straw arrow, to the end of which the bit of glass from which the fibre is to be drawn is placed. After softening the glass in a flame the arrow is shot into the air, and its track is marked by the fibre which streams behind it.

A Tambourine Clock.

A patent has recently been taken out in France for a clock in imitation of a tambourine. The parchment head of the tambourine constitutes the face of the clock, while the hours from one to twelve are represented by a circle of flowers. The hands are two bees, one large and the other small, which pass from flower to flower. The small bee passes swiftly from one flower to the next, completing the circuit in an hour; while the large bee simply crawls, taking twelve hours to make the round. The bees are of iron, and two magnets connected with the clockwork inside the tambourine move just under the parchment and draw the bees after them.

A Household Torch.

The figure illustrates a torch for domestic uses, such as thawing pipes, soldering, and burning off paint. It



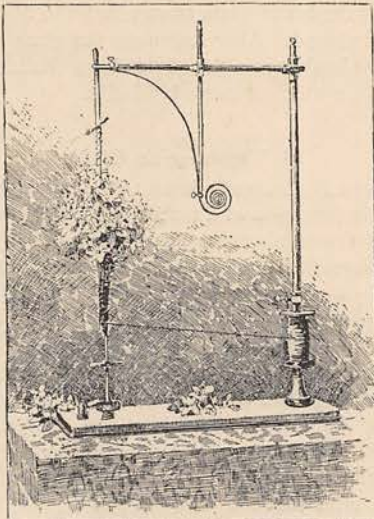
of benzoline, capable of feeding the flame for three hours at full blast at a cost of 2½d. The torch will keep alight in strong winds.

The Prison Puzzle.

Mr. R. A. Proctor, the well-known astronomer, has given a method of solving the "Prison Puzzle," which was recently given in the GATHERER. It appears to involve a quirk, as the solution consists in the prisoner starting from the cell A, going into one of the neighbouring cells, returning to cell A, and then leaving it by the other adjoining cell. This quirk being understood, there are many ways of reaching cell B. Of course this must be done by the prisoner only passing once through each cell.

A Bouquet Binder.

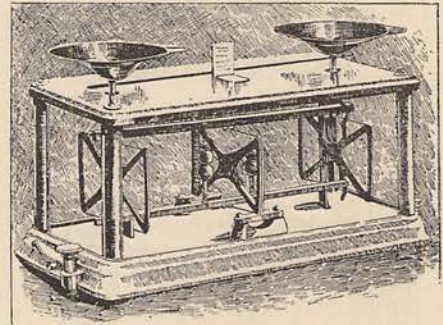
A little machine for binding bouquets has been brought out by a French florist, M. Mayard fils, of Chalon-sur-Saône, Vice-President of the Horticultural Society of that city. As shown in our illustration, it



consists of a bobbin on which wire or string is wound, and capable of being raised or lowered at will. The other part of the machine is a frame to hold the

is made to burn benzoline, and a small pump in it enables the user to apply a cold air blast to the benzoline, so as to produce the blaze shown in the woodcut. The reservoir holds 1½ pints

bouquet while the string is being applied to it. The bouquet is built round the vertical stem shown, and each flower can be severally bound in its place by the string. To florists the apparatus may be useful.



A New Balance.

The figure illustrates a new balance which has no knife-edges and their consequent friction. It consists of a beam firmly attached to a wire or band at right angles to it. The band or wire being tightly stretched, its torsion keeps the balance true. When weight is put on the balance to disturb it the wire is twisted, and the resistance to twisting increases with the arc through which the balance rotates. To increase the sensitiveness of the instrument a poise is attached to the beam by a standard. Balances made on this principle are capable of great accuracy; an ordinary shop balance, only 10½ inches, capable of weighing 50 lbs., being turned by two grains.

£75 PRIZE STORY COMPETITION.

The Editor has pleasure in announcing the award of the Prize in this Competition, for which thirty-eight competitors entered their names. The length of the MSS., and the high quality of the work in many of them, made the task of adjudication unusually long and difficult. One story, however, stood out clearly above the others, and the Editor therefore awards the PRIZE OF SEVENTY-FIVE POUNDS to the author of that story—

LAMBERT SHEILDS, 11, Adelaide Street,
Kingstown, Ireland,

whose story will be published in due course.

Honourable Mention is awarded to the work of three other competitors, whose names are given in order of merit:—

John Rice, 21, Walker Terrace, West Hoe,
Plymouth;

Agnes Mills Berridge, Fotheringhay, Oundle,
Northamptonshire;

J. M. Smythe, Southcote, near Port Elliot,
South Australia.

Unsuccessful competitors are requested to apply for their MSS. as soon as possible. Applications should in all cases be accompanied by stamps.