The GATHERER
An Illustrated record of Invention Discovery & Science

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 or work submitted.

A Self-closing Gate.

The gate which we illustrate closes at once, and is therefore unlike the gates that swing backwards and forwards until the latch drops into a notch of the keeper on the gate-post. The latch in this new gate is shaped like an inverted **U**, and when the gate shuts it, it catches on the keeper which is held between the two ends of the **U**. The new latch can, of course, be applied to doors as well as gates.

Cold and Magnetism.

M. Raoul Pictet, who, with Cailletet, first liquefied oxygen in 1878, and opened a new line of research at extremely low temperatures, has been trying the effect of great cold on magnetism, and finds that artificial magnets grow stronger as they become colder. It has long been known that a magnet ceases to attract iron when it is heated to a cherry red, but it is still uncertain whether there is any limit to its strength at low temperatures.

Refining the Diamond.

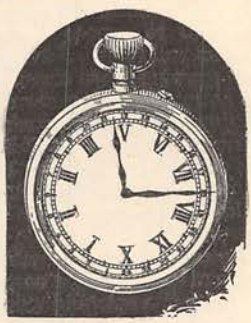
As we have already stated in THE GATHERER, diamonds—that is to say, crystallised carbon—can be made in the laboratory, but the specimens hitherto produced by art are quite too small for purposes of ornament or industry. One might as well try to decorate one's self with ground glass as the tiny brilliants of the chemist. M. Moissan, of Paris, has been the most successful in making artificial diamonds, and his method is to heat carbon in an electric furnace, and allow white hot iron to absorb its vapours. On suddenly quenching the iron in cold mercury the carbon vapour condenses into crystals. Some of these crystals are spotted with black, like the "crapaud" diamonds of South Africa, and they are not very clear; but M. Moissan has recently given them a finer lustre and removed the black spots, which are only carbon, by heating the gem in oxygen gas to a temperature of rather less than that required to burn diamonds. The hot gas oxidises the black carbon and refines the crystal. M. Moissan has tried this method on natural stones from South Africa and found that it removes the black specks which tend so much to diminish their value. Therefore, his experiments are not without a certain practical consequence, but he is just as far as ever from making large diamonds.

A Remedy for Stings.

It is stated by a foreign scientific journal that the raw juice of the poppy applied to the sting of bees or wasps is a speedy cure, alleviating both the pain and inflammation. As the remedy is a simple one, it is certainly worth a trial.

A Decimal Watch.

It was part of the original scheme of the metric or decimal system of weights and measures to introduce the decimal method of reckoning time, and public clocks for the purpose were actually introduced into Paris and Toulon, but the great public preferred to have their time served out as they had been used to have it, and nothing came of the innovation. However, the decimal system is apparently destined to become universal, and when the nations agree on the matter our time will probably be reckoned in tens and tenths—that is to say, there will be ten hours to the day, and ten minutes to the hour. Meanwhile, decimal time is useful to men of science, especially astronomers, and M. Leroy, clockmaker to the French navy, has brought out a watch giving decimal time, which we illustrate, and, moreover, he has devised a dial plate giving decimal time, which can be attached to any watch when it is required.



The Sympalmograph.

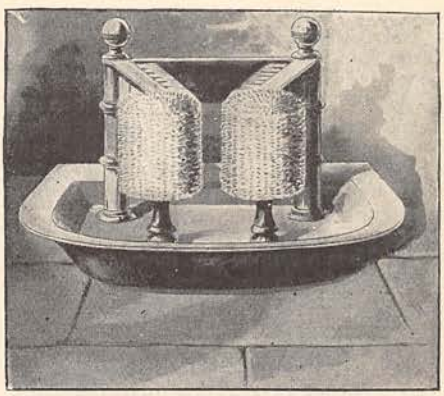
Our readers are probably familiar with the fact that beautiful and complicated curves can be drawn automatically by a pencil at the end of two conjoined pendulums in full swing, as in the apparatus known as Tisley's harmonograph. Mr. Charles E. Benham has recently applied this device to the production of artificial iridescence or rainbow tints on glass and metals by substituting an engraving point for the pencil. When fine lines or striations are drawn very close together on a surface, they produce "interference" of light and rainbow colours, hence the brilliant hues of birds' feathers and the spectra of the "diffraction gratings" used in astronomy for analysing the light of the sun and stars. When a surface of glass has been engraved in this way by the sympalmograph, as Mr. Benham calls his apparatus, and exposed for a few moments to the fumes of hydrofluoric acid, a lovely iridescence is communicated, which vies with the changing tints of the opal or the decayed glass of our museums. Polished metals, such as nickel or steel, give similar effects, but in their case the polish must be as perfect as possible—in fact, what is known as "specular polish." The process is likely to be useful in the decorative arts, and it is capable of being applied to gems such as the diamond.—While upon this subject, we may add that the diamond, which has long held its own as the hardest mineral, must now give place to an artificial mineral prepared by M. Moissan, whose method of refining the diamond we have already referred to, in his electric furnace. This is a compound of boron and carbon, made by heating carbon with boracic acid. It is black, with the lustre of black-lead, and cuts the diamond as easily as the diamond cuts glass.

A New Red Glass.

A red glass which is clear and bright and opaque to all the blue rays of the spectrum down to those of wave-length 628, has been brought out in Germany. Hitherto, it has been difficult to get a pure red glass for optical and photographic purposes, that is to say, a glass capable of giving quite a non-actinic light.

Signals at Sea.

Those who have been to sea will have noticed how difficult it is to fix the position of a fog signal. The sound often seems to come from no particular place, at least, on one side of the vessel, and this vagueness of direction is a frequent cause of collisions. An ingenious Frenchman, however, recently attempted with fair success to fix the direction in which the sound is travelling, and the position of the signal, by means of the telephone and microphone. A sensitive microphone is placed at the bows, and another at the stern of the ship. Each is connected to a telephone, and the telephones are attached to the ears of the observer, who is isolated from every sound but that coming from them. The telephone of the bow microphone is at his right ear, let us say, and that of the stern microphone at his left. Now it is obvious that if the sound is coming from the direction of the bows the observer will first hear it through the bow microphone, and if it is coming from the stern he will first hear it through the stern microphone. Again, should it proceed in a direction at right angles to the line of the ship he will hear it through both microphones at the same time. By a little practice he can tell the direction of the signal from the interval between the sound as heard through both microphones. Certainly his plan is the best that has been devised, and we hope it will be given a fair trial on the long ocean steamers. We also hear of a "secret signal" in the French navy which the sailors call "feu de ratière," or the rat-trap fire. No particulars of its nature are divulged, except that it enables a ship in the secret to discover a French man-of-war or squadron sailing with lights out on the darkest night, and that the rays which constitute the "feu" do not travel to the right or left, but only in front of the projecting apparatus. It cannot, therefore, be a method of telegraphing without wires after the manner described in a former GATHERER, nor can it be an application of the Röntgen rays, for these, at all events as they have been generated until now, do not penetrate the atmosphere very far. Perhaps some of our inventive readers will hit upon the true explanation.



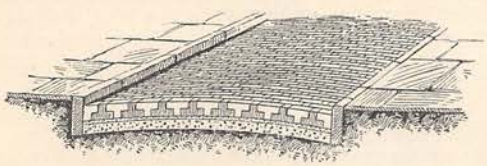
A New Boot Scraper.

The Arab shows his respect for a house by taking off his shoes on entering, and the modern Briton by scraping his boots. An efficient scraper is something of a boon in this wet land of ours, and that shown in the figure will recommend itself to ladies by its appearance as well as its action. It has the usual knife-edge scraper with a tray beneath, and in addition two brushes which are carried by springs, so that when the boot is thrust between them the brushes yield a little, and when the boot is withdrawn they press upon it, thus removing the dirt from it more thoroughly.

Purifying Wells.

At a recent meeting of the Polytechnic Society of Berlin Dr. Franck described a method of disinfecting wells, which has been tried successfully in the Rhineland. Heavy rains are apt to contaminate wells, and give rise to disease; but a well can be purified by suspending in its mouth an earthenware dish containing 50 to 100 grammes (750 to 1,500 grains) of bromine, which, being volatile in air, fills the well with vapour, and is absorbed by the water. The water acquires a slight flavour of bromine for a time, but is quite wholesome. We may also

mention here that ozone is now employed in purifying water for domestic purposes. Ozone is a condensed form of oxygen, and water being a combination of hydrogen and oxygen, it is sufficient to send a proper current of electricity through the water to separate the oxygen from the hydrogen, and produce a small percentage of ozone, which oxidises the organic matter in the water, and converts the ammonia and the nitrites into nitrates. The excess of oxygen in the water affects its taste, but this drawback disappears in a week or a fortnight. Hydrogen dioxide is also produced in the process, but this can be again decomposed by sending another current through the water from plates or electrodes of aluminium, so as to form aluminium hydroxide. The water is then filtered for use. *Apropos* of filters, some recent observations of Professor Lancaster's are worthy of attention. He declares that the ordinary filters in use do not clear the water from microbes. In order to do so with any effect, they would have to be boiled and sterilised every twenty-four hours. Nevertheless, they harbour colonies of harmless microbes, which, as is now known, kill the harmful ones, so that few or none of these are able to pass the filter. The film of "slime" which gathers on a filter bed is really a collection of harmless microbes which are inimical to the microbes of disease. In the animal system the white corpuscles of the blood destroy micro-organisms, and thus act as police. There is, therefore, a double safeguard against deadly microbes—namely, in the harmless ones and in the blood itself. Indeed, according to Professor Lancaster, it has been found that deadly or pathogenic microbes have no ill effects on the blood, unless the way is paved for them by another microbe. Thus a guinea-pig inoculated with the microbe of lockjaw is unaffected; but if it has been previously inoculated with the common microbe of putrefaction, it will die. Microbes found on rotten fruit act in this way as forerunners, and predispose the body to catch the infection of pathogenic microbes. Owing to the fact that the ordinary harmless microbes kill those of typhoid fever and cholera, impure river water may be more wholesome to drink when these diseases are prevalent than pure spring or distilled water, because it is swarming with the harmless organisms. Professor Lancaster sees no good ground for being "scared" at microbes, and probably as the subject is better understood the fears which have arisen in the public mind will be allayed.

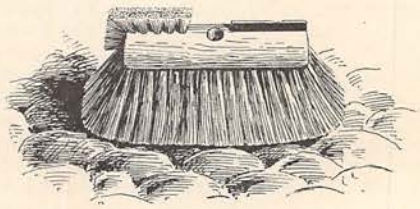


A New Brick Roadway.

Inventors are still trying to find the ideal pavement, and one of the latest attempts is that of Mr. G. E. Briggs, an American, who has recently introduced his plan into this country. Our illustration will give the reader a better idea of it than a long description. The bricks, as will be seen, are T-shaped, and lock into each other, one above, the other below, thus ensuring a compact, firm, and solid roadway suitable for light or heavy traffic. Such a road can be quickly made, and will prove very useful in the country as well as in towns.

The Octopus Plant.

It is reported that Mr. Dunstan, a naturalist, has discovered a "carnivorous" plant of a dangerous character on the shores of Lake Nicaragua, in Central America. The Indians call the plant "The Devil's Noose," and it is described as a veritable "land octopus." Its branches are black, flexible, and leafless, but covered with suckers, and a sticky gum emitting a fœtid odour. A dog belonging to Mr. Dunstan was caught by the branches, and fairly "limed" like a bird, so that it could not escape without the help of its master.



A Brass Broom.

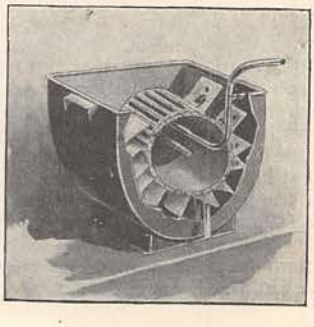
A very useful besom or broom for rough work, such as cleaning stables and stable yards, has been invented by Colonel Harbin. It is really a combination of broom, foot scraper, and brush, as will be seen from the figure, and since it is made of pure brass wire it is very durable and easily kept clean.

A Leather Gun.

The Government of the United States recently tested a cannon made on the wire-gun principle, as described in our article "A Walk through Woolwich Arsenal," but in which raw hide took the place of iron wire. The gun consisted of an inner steel tube wound with raw hide and copper wire, and covered with an outer jacket of steel. The official tests proved that it was capable of withstanding charges that would burst an ordinary gun, but, owing to the gun-carriage breaking down, they had to be interrupted. Lightness is the property aimed at by the inventor of the leather cannon, and we may add that attempts have also been made in America to make paper cannons, in which the raw hide is replaced by paper, but as yet they have not come into practical use.

A Print Washer.

A simple and ingenious little machine for washing photographic prints is shown in our illustration. The prints are set round a revolving drum or cylinder inside the washer, as shown, and a jet of fresh water is brought from the



supply-pipe by an india-rubber tube. The force of the jet makes the drum revolve and brings each print under the washing action of the water without any abrasion of its surface.

Cycle Novelties.

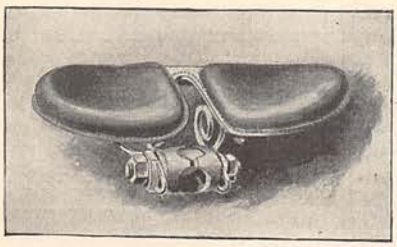


FIG. 1.

Bicycling would be much less tiring, especially for beginners and those who seldom practise it, were it not that the saddle does not yield sufficiently to the movement of the limbs. To overcome this drawback, M. Chaix, a French inventor, has devised a new saddle having two wings, as shown in Fig. 1, each wing supported on a spring which "gives" to the up and down movement of the legs. The saddle has several advantages in point of

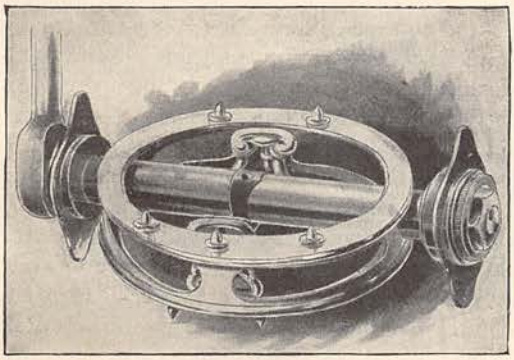


FIG. 2.

health and comfort, which cyclists will readily see for themselves, and it also adds to the speed of travel. Another novelty which diminishes the fatigue of cycling is the "moto" pedal of Mr. C. J. Morgan, which allows of a certain oscillating and lateral play to the foot, and reduces the tendency to cramp. It is shown in Fig. 2, and consists of a light ring with spikes to keep the foot from slipping, and springs which admit of the play required to guard the ankle from strain.

The Power of an Avalanche.

The avalanche which fell at Gemmi, in the Alps, in September last year, has been calculated by a French engineer to contain sufficient energy to lift 13,000,000,000 tons a foot high. Could the energy have been transformed into electricity, it would have sufficed to feed 90,000 electric lamps, each of 16-candle power, for five hours a day during an entire year. Certainly Nature seems very prodigal of her stores; but after all she really wastes nothing, and only transforms it into something else.

Petroleum Briquettes.

M. Maestracci, a French officer of marine, has found a method of making petroleum into solid briquettes like those of coal. It consists in heating together a litre of petroleum, 150 grammes of triturated soap, 333 grammes of caustic soda, and 10 per cent. of resin. The mixture is stirred as it heats, and after 40 minutes or so, when solidification begins the stirring is given up. Boiling over is prevented by adding a little soda, and the whole is run into moulds and baked in a stove. To make the briquettes more economical, 20 per cent. of sawdust and the same proportion of clay may be added to the mixture. The fuel thus prepared is portable, and gives three times the heat of ordinary coal briquettes. It is expected that by modifying the furnaces of steam-engines on locomotives and steamships, the new fuel will burn without smoke, and yield as much heat as four times its weight of coal.

A Gigantic Telescope.

The Proctor Memorial Association of the United States contemplate the erection of a great telescope on San Miguel, near the San Diego Peninsula, California. It will be made on the plan of Mr. Louis Gathmann, of Chicago—that is to say, the object glass will be built up of a number of smaller pieces so as to make a single lens of great size and power. The first telescope to be tried will have an object glass 10 feet in diameter, whereas the largest existing lens is only 3 feet 4 inches. If it succeeds, another lens ten times larger, or 100 feet in diameter, is to be made. We must not be too sanguine as to the success of these instruments, however, and we must not expect to "see men on Mars, and pick up pins on the moon," as one of the enthusiastic promoters puts it, because the "wavering" of the atmosphere, which increases with the power of the telescope, may interfere with the sight.

The Latest Claims.

We hear from the Ocean Accident and Guarantee Corporation that two more readers of CASSELL'S MAGAZINE have been paid compensation for burglary under our Burglary Insurance system. Both claims paid this month were to London householders—

Mr. G. PEARCE, Harlesden, £3.
Mrs. JULIA MCKISSOCK, Shepherd's Bush, £3 10s.

Full particulars of our Burglary Insurance will be found in our advertisement pages.

SUMMARY COMPETITION.

The Editor has pleasure in publishing the Award in this—the last Competition in the present series.

The First Prize of ONE GUINEA is awarded to
LLEWELLYN H. ROBERTSON,
108, Bloor Street West,
Toronto, Canada;

And the Second Prize of HALF-A-GUINEA to
ELIZA FERGUSON,
87, Montgomery Street, Edinburgh.

HONOURABLE MENTION is awarded to the paper sent in by
AMYAS SELWYN, Newcastle-on-Tyne.