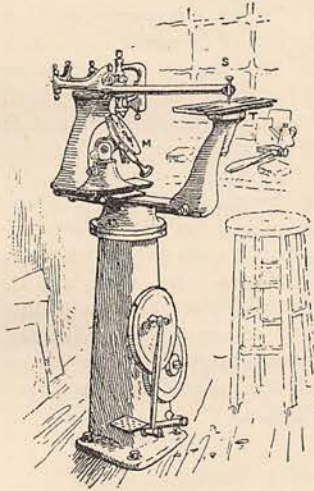


## THE GATHERER: AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.

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 Engraving Machine.



A machine for engraving designs, letters, and figures on ivory, metal, glass, and so on, is illustrated in our figure. The material to be engraved is secured to the machine at M, and the cutting is done by a revolving cutter, supported by a hinged link, allowing it to be moved in all directions. The spindle of the cutter is vertical, and driven by a gut band from the treadle

motion shown. A copy of the design to be executed is fixed on the table, T, and a style, S, is moved by hand along the lines of the copy. A system of levers, like those of the pantograph, guide the cutter in a similar path over the surface to be engraved. The apparatus, as shown in the figure, is adjusted to reduce the copy given: the style is worked by the right hand, and the cutter is controlled by the left hand through a milled nut.

### A Dust Excluder.

A new material for excluding dust and draughts has been brought out. It becomes pliable when heated, and can thus be fitted to the outlines of doors, windows, and so on. It retains its shape on cooling until softened by hot water again. The composition is enclosed in a fillet of maroon-coloured cloth, which is nailed to the frame of the window or the stile of the door.

### Turkey Red from Beans.

A German chemist has brought out a process for making Turkey red oil from the beans of the castor plant. The beans are hulled and treated with strong sulphuric acid, the whole being ground up. The sulphated oil is drawn off, and afterwards neutralised with ammonia or caustic soda in the ordinary way.

### Sea-Water for Streets.

The Commissioners of Bournemouth have adopted a plan for sprinkling sea-water on the streets and flushing the sewers. For this purpose the water is laid on to the town by water-mains and hydrants. It is anti-

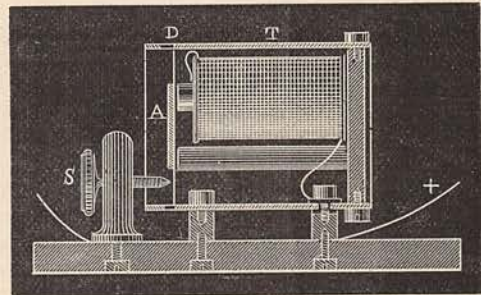
ipated that the supply will not cost more than 5d. per 1,000 gallons, and that in thirty years' time, when the debt for the works has been reduced, the cost would not be more than 3d. per 1,000 gallons. Salt water is said to be successful in laying dust, and provides a kind of skin holding it down. In ordinary weather, according to one authority, a sprinkling of salt water every other day is as good as a sprinkling of fresh water every day. Moreover, it is believed to have no prejudicial influence on health.

### A Sawdust Non-Conductor.

A Danish firm have introduced a non-conductor of heat for water-pipes and boilers, principally made from sawdust. The composition can be moulded into the required form and applied cold. It does not injure the metal in contact with it, and water or steam leaking out will pass through it without spoiling it. Moreover, it is incombustible, and has a neat appearance. In Denmark it is being used at large factories, gas and water works; and it is to be introduced into England.

### A Travelling Platform.

One of the devices proposed for the Paris Exhibition of 1889, is a travelling platform which will convey passengers at the level of the floor and grounds through parts of the Exhibition. The rails will be laid in a cutting, and low trucks floored over will be run on them; so that passengers can step off or on at once and be transported to different parts of the premises. The length of the line proposed is 2,080 metres, and it is intended to work the train by electricity. Elevated stands can also be provided on the platform as cafés, and telephones will communicate with the attendants.



### An Electrical Trumpet.

The electric trumpet of Dr. Legang, a French inventor, is designed for use in place of the ordinary electric bell. It consists, as shown in the figure, of an electro-magnet contained in a brass tube, T, about

2¼ inches long by 1½ inches in diameter. A soft iron armature, A, is mounted opposite one pole of the magnet on a metal diaphragm, D, which on vibrating makes and breaks contact with the screw, S. This screw, the diaphragm, and magnet, are all in contact with a battery of two Leclanché elements, so that when the current is on, the diaphragm, D, vibrates and emits a trumpet-like sound. The current may be interrupted like a telegraph current, and then the apparatus acts like a telegraph sounder. The note it emits is musical, and some may prefer it to the ring of a bell.

#### An Almond Mill.

The nut and almond mill which we illustrate consists of a vertical cylinder of tin, in which a conical



grater works another of cylindrical shape having the grating side outermost. The nuts are put into a reservoir at the bottom, and the machine is worked by turning the handle shown. The almonds caught between the two graters are ground so that every part of them passes through the holes and falls into the receptacle below.

#### Earthquakes and Telegraphy.

During the third shock of the earthquake at Nice on February 23rd, a soldier on duty at the French fort of Tête de Chien, Nice, was telegraphing to a colleague of the "Drette," giving an account of the effects of the second shock which had passed, when all at once he felt a shock and fell back in his chair stunned. Since then he has experienced tremblings of the right arm and headaches. Dr. Onimus, who has investigated the matter, believes that the soldier received a strong electric shock through the telegraph key which he was working at the time. It has long been known that earthquakes produce electric disturbances in telegraph lines; and it may be that in this case the current was so strong as to give a decided shock.

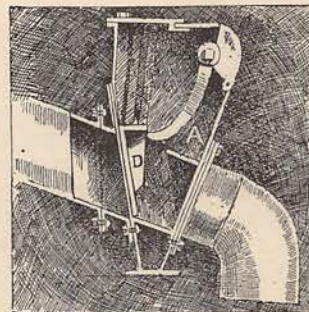
#### Colour Photography.

It has been announced that a well-known West-end photographer has made an advance in photo-

graphy in the direction of producing coloured portraits without the aid of the brush. The process is not yet fully described, but it is stated that the colours are all hydrocarbons, and the image is completed by chemical action. It is produced between two films not thicker than tooth of an inch. The portraits are said to give the tints in a very life-like manner, and to resemble coloured miniatures. While upon this subject we may mention the new "papyrotint" process of photo-lithography, specially adapted for the reproduction of drawings, in half-tone, of buildings or subjects from nature. Its advantage over other methods of half-tone photo-lithography is that a transfer can be taken in greasy ink for transfer to stone or zinc direct from any negative, however large, without the aid of a medium; the grain or reticulation being obtained by chemical change. Owing to the transfer paper being in direct contact with the negative, the resulting prints are sharper than by those processes where interposed media are used; and the same negative answers for a silver print, a platinotype, or a transfer for zinc or stone. The advantage of being able to use a non-reversed negative is considerable now that gelatine plates have so largely superseded those of collodion.

#### A Drain-Gas Excluder.

Mr. McCallum has devised a method of ventilating drains by means of the flow of the running sewage. His system consists in dividing the sewer into sections by means of shafts to the surface and valves, so that as the sewage flows it creates a draught which changes the air in the sewer and mixes it with fresh air before it is discharged. In this connection we may mention, however, that recent investigations of Professor Carnelley tend to show that the majority of germs in sewer air come from the outer air, and that if care is taken to prevent splashing of tributary sewage into the main drain, the air of sewers is really not conducive to the production of germs. These mostly come from without, and there appear to be even fewer germs in sewer air than in outside air: a fact probably explained by an experiment of Professor Carnelley, which seemed to show that water flowing in a



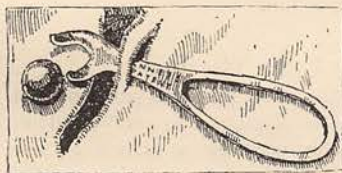
pipe tends to clear the air in it of germs. The exclusion of sewer air from houses will still, however, be studied, in all probability, and our figure shows a

sewer-gas excluder recently brought out. It is placed between the ordinary trap and sewer. The curved arm, A, is pivoted on a spindle, to which motion is given by the flushing chain, and the sliding door, D, is then lifted up so as to allow a free passage until the flushing is completed, when it falls again, and hermetically seals the soil-pipe.

#### Freezing Mercury in Flame.

An interesting experiment, which illustrates the power of science, was recently carried out. Carbon dioxide was generated in a holder of Bessemer steel under a pressure of 3,000 lbs. to the square inch, then allowed to escape in the form of solidified gas, like snow. The temperature of the flakes was about 168° below zero (Fahrenheit). A ball of the snow having a depression at one side was made, and put into a red-hot crucible on which the intense heat of a Bunsen burner played. Mercury and ether were placed in the depression on the snow-ball, and, notwithstanding the heat, the mercury froze. The cold of the solidified gas defeated the heat of the crucible. The experimenter also set fire to the ether, but was still able to pick out the frozen globule of mercury.

#### A New Button-Hook.



The button-hook shown can be used for buttoning boots, gloves, and so on, without tearing off the buttons. By the peculiar

shape of the hook, concave above and convex below, and the convenient handle, the button is lifted properly through the hole with a gentle turn of the handle.

#### Vegetable Pearls.

In the East Indian Islands the endosperm of certain coconuts is found to contain a "vegetable pearl," in the form of a round or pear-shaped stone, of white and pearly lustre. The stone is highly valued as a charm or as a gem by natives of the East. It is a pure carbonate of lime, and is probably a secretion similar to the "tabasheer" of the bamboo recently referred to in the GATHERER. We may add that stones of the sort are sometimes found in pomegranates and other plants. Apatite has been found in teak-wood.

#### A New Glow Lamp.

In the ordinary electric incandescent lamp the carbon filament glows with a bright light which is somewhat dazzling to look upon, and is perhaps not very good for the eyes. Hence the practice of shielding the filament with ground glass or coloured shades, and of fixing the lamp where it is outside the range of the eyesight. A new lamp brought out by M. Gimé, of Brussels, is reported to be free from this drawback, inasmuch as the filament is surrounded by a luminous

aureole which presents a soft radiance to the eye. The aureole is produced by forming the filament so that radiant discharges take place within the bulb of the lamp. The bulb is filled with hydrogen under pressure, and the luminous discharge takes place in it. The lamp appears in fact to be a kind of union of the well-known Geissler tube effect and the electric incandescent filament.



FIG. 1.

#### A Bicycle Shelter.

A portable shelter for bicycles is shown in our illustrations. It can also be used for a tennis-shed or tool-house, if desired. The framework is of seasoned timber bolted together, so that an amateur can readily undo it in a few minutes. The covering is of sheet galvanized iron, but the door is of wood. The bolts, screws, and so on, are of galvanized iron. Fig. 1 shows the kind specially adapted for bicycles; it is six feet high to the eaves, that is to say, the lowest part of the roof.

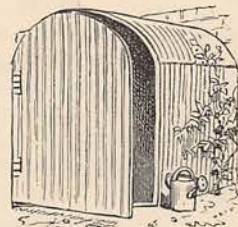


FIG. 2.

#### Lead in the Brain.

Cases of sudden death have taken place at a certain lead factory in the East-end of London, and these have been attributed to lead-poisoning. In one case lead sulphate was separated from the liver of one victim by analysis, and in another it was found in the brain. It has been calculated that the whole brain would probably contain 117.1 milligrammes of lead sulphate. Mr. Blyth throws out the suggestion that lead may form compounds with essential parts of the nervous system, leading to destruction of important nerve centres.

#### Aluminium-Steel.

Aluminium-steel, a new alloy produced by the electric smelting process, recently described in the GATHERER, is now used for welding steel and iron together. A sample bar of iron, welded to a bar of Siemens-Martin steel, with one-fifth per cent. of

aluminium added, shows no line of weld, and the characteristics of the steel extend into the iron. The aluminium-bronze is also reported by the President of the Institution of Naval Architects to be of enormous tensile strength and free from corrosion, and, if produced cheap enough, will create a "revolution in naval engineering." A forged bar of aluminium-bronze, containing 5 per cent. of aluminium, broke at a stress of 36 tons on the square inch, with 60 per cent. of elongation.



#### A Turbine Tennis Marker.

A marking brush for tennis and football grounds, which has given satisfaction, is shown in our illustration, which shows the round brush and handle. A shield covering the upper part of the brush serves to prevent splashing. It is used with whitewash of medium consistency, a firm pressure being applied to the brush.

#### Spodumene Crystals.

During excavations in the Etta tin-mine of Pennington County, Dakota, United States, a set of crystals of spodumene were laid bare, which are perhaps the largest of known natural crystals in the world. One of them is thirty-six feet long, and from one to three feet thick. While upon this subject we may mention that in the Quaternary gravels of the Loire valley in France, large hollow pebbles, about one inch and a half in diameter, are found, containing water, and sometimes also a stone inside. No trace of cracks can be seen by the magnifying-glass, and the question is how the water got there.

#### Gas from Tar.

A process recently brought out by a Leith firm, is said to be an economical way of utilising coal-tar, peat, wood, and turf, for the manufacture of coal-gas. It is stated that one ton of peat will yield 18,000 cubic feet of gas. The tar is first distilled in a retort, which gives a mixture of steam and hydrocarbon vapours. These are decomposed in a separate retort and passed over a surface of red-hot charcoal and iron, which converts the vapours into illuminating

or heating gas, as desired. It is also claimed that the method is an economical one for making gas from inferior coal.

#### A Knife in a Fish.

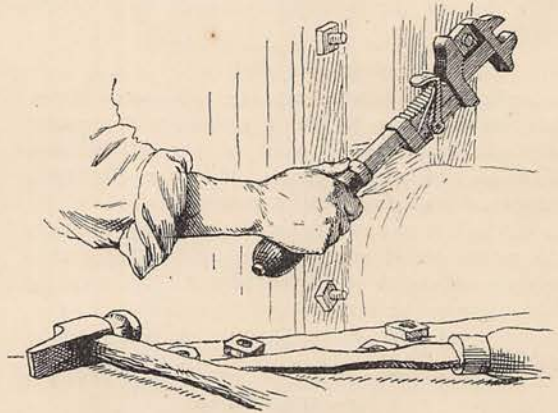
A recent bulletin of the United States Fish Commission reports the capture of a codfish at Gloucester, Massachusetts, in September, 1886, which contained a pocket-knife of curious workmanship embedded in its flesh. The knife has a brass handle curved and tapering, with a slit in the hollow side for the blade, which is of lance shape. It is  $6\frac{1}{4}$  inches long, and it is thought the owner must be some aborigine, or perhaps a sailor. The knife was discovered by accident in handling the cod.

#### Sofa Car Seats.

Sofa seats have been substituted for chair seats in some of the drawing-room carriages of the Boston and Albany Railway, United States. They admit of the passenger changing his position, which chair seats hardly do, and they also give space for parcels, books, and so on. Moreover, they allow of a better range of view when looking out of window. They are charged for at the same rate as chair seats; and the experiment of their introduction will probably be popular. At all events, it is being tried in order to determine whether this will be so or not.

#### A New Screw Wrench.

A Texan inventor has lately patented an improved screw wrench, which we illustrate in our woodcut. Its form will be readily seen by a glance at our illustration. The fixed head of the tool is provided with a slot, which serves to turn nuts which cannot, by reason of their position, be reached with the side



of the wrench. The sliding jaw is provided with two surfaces, one running close up to the fixed head, and the other so placed as never quite to reach it. The advantage of this arrangement is obvious; it allows a workman to use his wrench for nuts of various sizes without readjustment. A catch, controlled by a spring, bears against the outer edge of the sliding jaw to secure it from slipping.

### Fire-Brick Paving.

Fire-brick has been successfully tried as paving in Steubenville, Ohio, United States. The surface of the road is removed to a depth of 1 foot, and 4 inches of sand put in, then 4 inches of gravel, and 4 inches of fire-brick set on edge. The cost of the paving is small, and it affords a good foothold for horses.

### A New Remedy.

Antipyrine, a substance discovered by Knorr in 1884, and with a chemical constitution of  $C^{11}A^{12}Az^2O$ , has recently been found by a French *savant* to be a harmless and efficacious medicine for pains.

### Tuning by Telephone.

A dealer in musical instruments in a provincial town in England was recently required to supply a piano which should be in tune with a certain organ. As the organ was at a distance, and there was no time to lose, the dealer happily bethought him to try the telephone; and the result was that by getting the distant organ played the dealer was able to hear its notes by telephone, and to select a piano suitable for it.

### A Spring Lock.

A spring lock adapted for railway carriages, and acting when a door is slammed, has recently been brought out. The spring which latches the door can be taken out and replaced in half a minute should it give way. This is done by a key or a pair of round-nosed pliers. When the door is slammed, the bolt springs out and locks the door with the handle vertical. When the handle is turned horizontal, the bolt is rotated 90°, and is then secure independently of the spring.

### Bat Guano.

Guano produced by bats is known to exist in large quantities in certain caves of Victoria, New South Wales. Some of these are sufficiently rich in nitrogen and phosphoric acid to be useful in agriculture as fertilisers—for example, the Skipton Cave guano, found some thirty miles south-west of Ballarat. Until lately the Skipton Caves were inhabited by innumerable bats. According to a recent examination, the guano is found when treated with water to give up a considerable part of its fertilising material, yielding a dark brown liquor suitable for top-dressing.

### An Absolute Unit of Time.

After pointing out that the "second" is an arbitrary and variable unit of time, M. Lippmann, the well-known physicist, in a recent communication to the French Academy of Sciences, goes on to propose an electric resistance as the absolute unit of time. The specific resistance of mercury in absolute electrostatic units is an interval of time. The practical unit may be a known multiple of it; and M. Lippmann describes one of several methods by which the interval can be realised. This involves the use of a condenser

and a resistance apparatus, which he esteems preferable to the astronomical clock in point of invariability.



FIG. 1.

### Adjusting Braces.

The figures show back and side views of some new braces that have recently been patented. The main feature of these new braces is the cross-tree arrangement, which, especially at the back, gives a very good result. By means of this device all dragging of the trousers is avoided, the cross-tree acting in such a way as to keep the cloth between the buttons in its proper position round the body. As will be seen from Fig. 2, the cross-tree of the side piece of the brace is provided with more than one opening for the hook at the end of the strap, thus allowing the wearer to arrange the brace entirely to his own comfort.



FIG. 2.

### Sea Telephony.

Mr. Edison, the well-known inventor, is reported to be engaged in perfecting a system of telephoning under water, so as to enable ships to communicate with each other even in thick weather. He is stated to have succeeded to a certain extent hitherto, and to be continuing his experiment. The plan followed has not been fully described; but it is given out that the signals are produced under the water by small explosions. These explosions are long and short in duration, like the signals of the Morse telegraph code. The impulses they set up in the water are transmitted through it and received on a telephonic apparatus. It is to be understood that while one ship makes the signals, the other receives them. Not long ago an engineer tried a method of telegraphing under water

by sound signals. The receiver in this case was, however, merely an oar-shaped piece of sonorous pine wood, having the blade in the water and the end to the ear. We may add here that the induction on telephone lines has recently been investigated by Mr. W. H. Preece, F.R.S., with curious results. It is well known that if two telephone lines, or a telephone and telegraph line, run parallel to each other in the neighbourhood, the currents in one affect the other by "induction" through the air. In the case of telegraph currents, the result is a pattering noise in the telephones on the neighbouring telephone line. But it has only recently been found that these overheard sounds really go to great distances. Mr. Preece has instituted experiments on Post-office wires, and finds that the noises can be heard on parallel lines forty miles apart; and two submarine cables five miles

apart have also been similarly influenced. It does not appear to be quite clear, however, whether the effect is really due to "induction" or to "conduction" through the earth from one line to another. This point is to be investigated by future experiments. Meantime no alarm need be felt as to the secrecy of telegraph and telephone messages, because the effect can be cured by the use of return wires, or in other words, a complete wire circuit, for a particular line; and moreover, the telegraph instruments most in use by the Post-office only give a confused unintelligible pattering on the adjacent telephone lines. We may add that the Post-office has adopted the Multiplex telegraph of Mr. Delany, of the United States, an apparatus which works with great speed, and whose messages will not be understood, if intercepted, by telephone.

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## CONVERSATION COMPETITION.

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WHO is there that has not at some time or other been at a loss for a topic of conversation? Surroundings may be perfect, and companions most agreeable, yet for lack of fresh subjects of conversation everybody is made uncomfortable. No one cares to hear or talk any further about the weather, it is not always possible to broach the Parliamentary reports without getting on to debatable ground, the fluctuations of the market have no meaning for ladies, and gentlemen take lamentably little interest in the subjects dearest to ladies—so after one or two forced and conventional remarks conversation generally flags. Surely, in such a busy world as ours, there should be no paucity of topics of conversation, and it is in the belief that some of these only need pointing out to be adopted, that the Editor begs to offer

A PRIZE OF THREE GUINEAS for the  
 MOST ORIGINAL AND SUITABLE TOPICS OF CONVERSATION  
 on the four following occasions:—

- |  |   |
|--|---|
| (1) A MORNING CALL.                      | (3) DURING DINNER (in the Dining-Room). |
| (2) BEFORE DINNER (in the Drawing-Room). | (4) IN THE TRAIN.                       |

The four occasions should be dealt with in the course of one Paper, the length of which must not exceed 3,000 words.

All MSS. must be duly authenticated in accordance with Rule 3, and must reach the Editor not later than October 3rd, 1887.

The following are the Conditions under which the Prize is offered:—

1. Every Reader of the Magazine (not being an ordinary contributor to its pages) is eligible to compete for all or any of the Prizes offered. Winners of former Prizes during the current year may not, however, compete again.
2. The Editor cannot undertake to answer inquiries having reference to the treatment in detail of the above subject. *The descriptions given above are sufficient for the purposes of the Competition, and the rest is left to the judgment and discretion of the competitors.*
3. Each MS. must have inscribed on it, or otherwise securely attached to it, the name and postal address of the author, together with a declaration that the work is *original and entirely the sender's own*, to be signed by the author and countersigned by some other trustworthy person, *i.e.*, a magistrate, minister of religion, or householder, with the postal address in both cases.
4. The copyright of the Prize work will become the property of the Proprietors of this Magazine.
5. Should the two best works in the Competition prove of equal merit, the Prize may be divided at the discretion of the Editor. The Prize may be withheld in the event of no composition being thought worthy of that distinction.
6. The Editor will not be responsible for loss or miscarriage of any work, and all letters or packets must be *prepaid*.
7. *The Editor cannot undertake to return unsuccessful MSS.*—copies should therefore be retained by the senders.
8. Every MS. must be sent *before* the date named above as the latest day, addressed—The Editor of CASSELL'S MAGAZINE, La Belle Sauvage, London, E.C., and must have the words "Prize Competition" in the top left-hand corner of the envelope or wrapper.