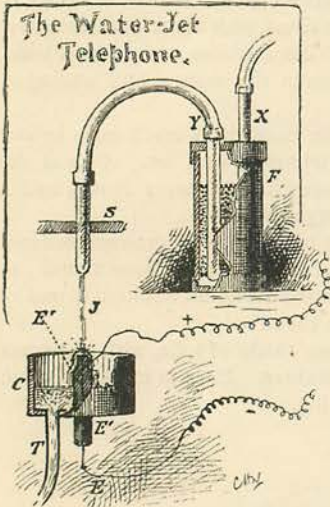


THE GATHERER:

AN ILLUSTRATED RECORD OF INVENTION, DISCOVERY, LITERATURE, AND 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.

The Water-Jet Telephone.



membrane or plate so as to form a sheet of liquid on the latter, the dimensions of the sheet vary with the vibrations of sound communicated to the plate. If, therefore, an electric current be sent through the sheet crosswise, the electric resistance of the liquid also varies with the vibrations, and a Bell telephone included in the electric circuit is found to reproduce the sounds, owing to the current varying in strength according to the changes of electric resistance in the sheet produced by these sounds. This telephone has been brought to a practical shape recently, and the patent rights of it in the United States acquired by the American Telephone Company. The working of the apparatus will be understood from the figure, where *J* is the jet of falling water which forms a sheet or *nappe* in falling over the top of an ebonite plug *E¹*, through which runs a negative (-) electrode, *E*, of platinum. The current traverses the sheet of water between this electrode and a positive electrode (+) of platinum, seen above. A receiving telephone is connected in the circuit of the wires (+ -) which run to the distant station. An ebonite cup, *C*, contains the flowing water, which escapes by the waste-tube *T*. The pipe which delivers the jet, *J*, is attached to a diaphragm or plate, *S*, which is a sounding-board to catch the vibrations of the voice, and communicate them to the jet of water, thus altering the size of the sheet below, and varying the strength of the electric current flowing through it, in a manner which causes the current to reproduce the original sounds in the distant telephone. Water is supplied in a pure state, and especially free from lead,

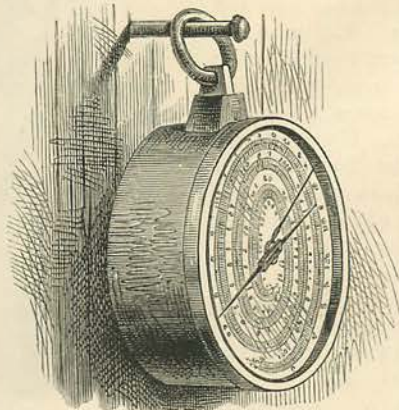
by the supply-pipe *X*, the filter *F*, and the exit-tube *Y*. A little sulphuric acid is mixed with the water to make it more conductive of the current, which is supplied by some twenty small Leclanché cells. The actual apparatus differs somewhat in detail from this arrangement for the sake of convenience; and the whole is enclosed in a teak box about three feet high, with an orifice for speaking into. It can be operated with a few Leclanché cells, and is useful on long lines. The speaking is said to be very good. Mr. De Tunzelmann, B.Sc., states that the arrangement shown in our figure has reproduced quite distinctly the voice of a person speaking in an ordinary tone at a distance of twenty feet from the instrument.

Distilled Water for Washing.

It has been clearly proved that those who suffer from a sensitive skin, subject to frequent irritation and roughness, should never use hard water for their ablutions. Boiled water will often prove beneficial for delicate complexions, but distilled water is the best to use in such cases.

A New Aneroid.

The aneroid we illustrate is the invention of Major Watkin, R.A., and is considered by some to be the "aneroid of the future." Its chief advantage over the older forms is that it has three circles of figures instead of one, thus giving a more open scale and a greater range of reading. An index shows which of the circles is to be read. The aneroid is also made in one or two other patterns, with or without an altitude scale.



A NEW ANEROID.

Electric-Lit Spectacles.

Our illustration shows a pair of spectacles for surgical examinations, lit by means of a small electric lamp, which sends a beam of cool light on the part to be examined. The rims of the spectacles are so formed as to exclude the outside light from the observer's eyes. The current is conveyed to the lamp by wires connected to the small terminals.



Ventilation of Rooms.

Mr. Thomas Fletcher, F.C.S., writes from Warrington:—"On p. 538 of your issue for August is an article on this subject which gives several methods for obtaining ventilation from ordinary sash windows . . . The proper way to do this is to have a hinged board on the lower frame, the width of the window and about three inches deep, with a ledge cut in the board on which the lower sash closes. This board is water-tight against a storm of rain, and as made admits of ventilation on its upper edge, and also between the joint of the two sashes. It is an old and well-known arrangement in this district, and one which we have had in use for many years. It requires no alteration of existing arrangements, is cheap, easily fixed, and can readily be removed from one house to another. The cost is trifling, and the result obtained is all that can be desired."

A Paper Test for Electricity.

A prepared paper or "Polereaugenzpapier" has been brought out, for telling the positive and negative poles of a dynamo or electric installation. In a recent GATHERER we gave an account of a fluid test of this nature; but the paper may be preferable in some cases. It can be obtained from electrical novelty stores. The books sold contain slips of test-paper which, when moistened and placed on the bare wires conveying the current, change colour. The negative pole changes the colour of the paper to red.

A Storm Anchor.

A makeshift anchor for vessels in distress has recently been tried with success. It consists of two canvas bags four feet wide in the mouth, and five feet deep. In the experiments two were employed, one fastened to an iron hoop, the other to a wooden frame. They were thrown into the sea and made fast to the bow of the vessel by a stout rope. The object of the device is to bring a vessel head to sea when all other means fail, and she is in danger of foundering. A small vessel weathered a terrific gale in the Bay of Biscay some years ago by this means. The bags are eyeletted at the bottom to prevent the pressure of the water bursting them, and are suspended a few feet below the surface.

More Danger from Arsenic.

Once more a warning word is needed as to the presence of an old danger. Poisoning by arsenical wall-papers is in these days more or less generally guarded against, but we have now to be careful lest we are poisoned owing to the presence of arsenic in Indian muslins and curtains. At one of our colleges, recently, a strange epidemic has been prevalent, with all the symptoms characteristic of the action of an irritant poison. The presence of arsenic in the atmosphere was at once suspected, and, although the wall-papers proved to be harmless, it was found that the brilliantly-coloured cretonnes and Indian muslins with which the rooms had been decorated were highly arsenical. It should be added that it is not only the more gaudy hues which should be guarded against, many of the dark shades being equally dangerous.

Solidifying Petroleum.

Dr. Kauffmann, a chemist in charge of experiments made for the Russian Government to find a method of solidifying petroleum, has reported a successful plan. It consists in heating the oil, and then adding from 1 to 2 per cent. of soap. The soap dissolves in the hot oil, which, on cooling, solidifies to a kind of tallow. The tallow burns slowly without smoke, but develops a great deal of heat, and leaves about 2 per cent. of a hard black residue.

Wire Hooks.

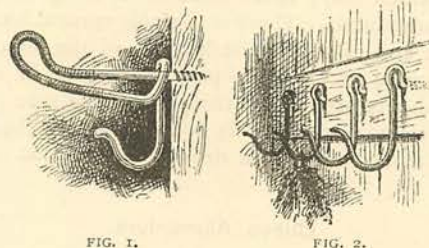


FIG. 1.

FIG. 2.

Figs. 1 and 2 illustrate two forms of wire hook now being introduced by an American manufacturing firm. The first is an ordinary hat-hook, the second a wardrobe-hook. They are made out of one piece of iron, and have a shape which insures great strength.

A New Magneto-Electric Bell.

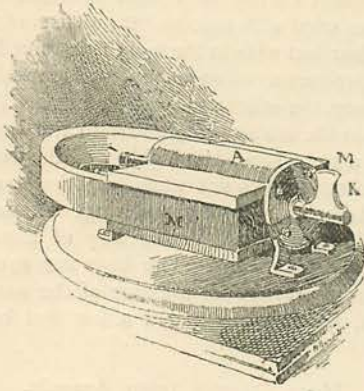


FIG. 1.

A domestic electric bell, requiring no battery, is shown in our engravings. Fig. 1 represents the bell-push, and Fig. 2 the ringer. The push arrangement is not a mere press-contact, as in the case of a battery bell. It is really a small magneto-electric generator, which produces a current by the act of ringing the bell. It consists of a horse-shoe permanent magnet, M M, having a bobbin of wire, A, mounted on a spindle between its poles. This is the armature of the generator, and it is turned to and fro between the poles of the magnet by moving the finger-key, K, on the end of the spindle. A pulsatory current is thus generated in the bobbin, which is connected by two wires to the bell itself (Fig. 2). This contains, under the gong, G, an electro-magnet with a polarised armature, so arranged as to vibrate when the pulsatory current from the generator traverses its coils. To the armature is attached a clapper which strikes the gong and rings the bell. The terminals for making the connections are shown at T. Such a bell will keep on ringing as long as the finger-key of the generator is worked, and, requiring no battery, it is little likely to get out of order.

A Musical Skipping-Rope.

A novelty for children, in the form of a skipping-rope which plays tunes while it is being used, has been introduced. There is a small musical box fixed at the end of one of the handles of the rope, and the turning of the rope puts it at once in action. The idea is pretty, and the price of the rope is said to be very moderate. It is to be hoped, however, that the box is not of a delicate constitution.

Cheap Aluminium.

A new chemical process for extracting aluminium has been put in operation near Birmingham, and the price of the metal is now considerably reduced. The method consists in forming a double chloride of aluminium, and reducing it by means of sodium and cryolite, which acts as a flux. To 80 lbs. of double chloride

are added 25 lbs. of sodium, and 30 lbs. of cryolite. This charge is heated for two hours, at a temperature of 1,000 degrees, and about 8 lbs. of aluminium are obtained from it, the impurities being only about two per cent. The new company expect to put out 500 lbs. of aluminium a day, and the price, from 40s. to 45s. per pound, is brought down to 15s. by the Castner process. The metal is also prepared by the Cowle electric furnace, one of which has been erected at Stoke. The price of this very light metal has prevented its being used for a greater variety of apparatus, from "brass" instruments of various kinds to field telegraph wires. Its weight is only one-fourth that of silver and one-third that of iron, its specific gravity being 2.67. Moreover, its alloys with copper and other metals are very pretty and durable.

Training Guns by Electricity.

Electricity has been applied to the manœuvring of heavy guns. Under the platform supporting the gun are fixed two electric motors, one at the edge of the platform for moving the latter horizontally through an arc of a circle; the other beneath the gun itself for raising or lowering the latter. The platform is moved by means of a toothed wheel, driven by the first motor, and gearing with teeth on the side of a fixed rail forming an arc of a circle beneath the platform. The gun is raised or lowered by a toothed wheel on its axle, which is driven by a worm gearing from the second motor. The control is effected by moving the brushes of the motors, thus regulating their speed, or starting, stopping, and reversing them.

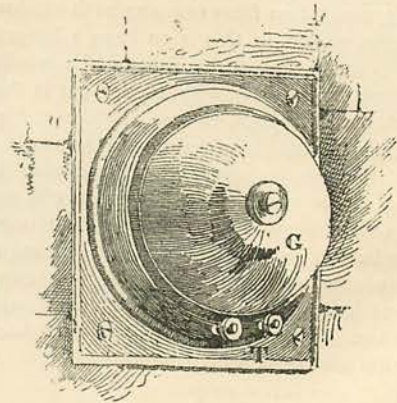


FIG. 2.

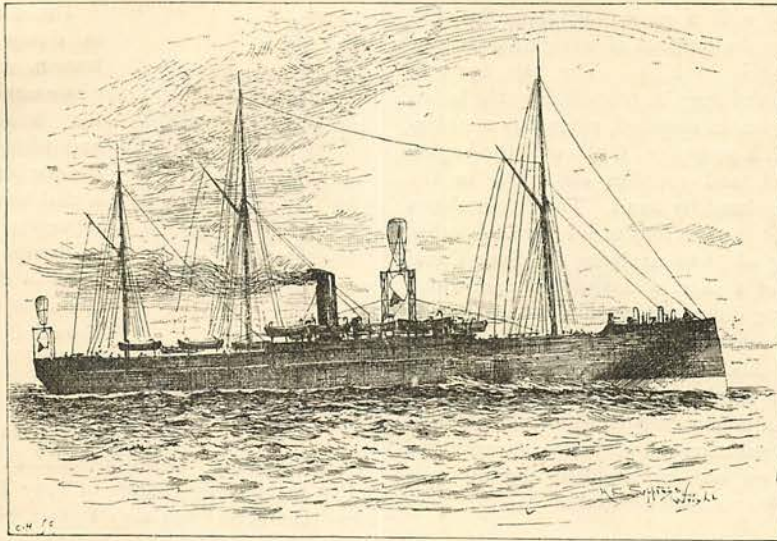
Large Rock Crystals.

Splendid specimens of rock crystal have recently been found in Ashe County, North Carolina. Among the most remarkable are one weighing 188 lbs., and another of 285 lbs. The latter is 29 inches long, 18 inches wide, and 13 inches thick. The pyramidal termination is perfect. There are many of 20 to 30 lbs. each; and it is proposed to utilise them for optical and ornamental purposes.

Lighting with Magnesium.

At Marbourg, in France, a lamp burning magnesium wire has been installed by M. Juss in a brewery. The lamp has an intensity of 450 candles, and is enclosed in a globe of unpolished glass. The light is white and steady, and capable of lighting a room fifty feet long by thirty-three feet wide. The brilliance is similar to that of electricity, and the cost of maintaining the lamp is stated to be one shilling per hour. The light of burning magnesium is proved by the spectrum to bear a close resemblance to solar light, and hence is well adapted for photography. We may mention that Messrs. Miethe and Gaedicke have taken a photograph of the eye in a perfectly dark room by means of a flash of magnesium. The pupil is fully dilated, as its contraction had not begun before the impression was taken. This kind of photography is likely to be useful in ophthalmology, as the eye has hitherto been a difficult subject for the camera.

lapping each other. Herr Vogt claims to effect a considerable saving in power and fuel, because doing away with the loss caused by the common screw in drawing away the supporting water from the vessel—a loss averaging forty per cent. of the tow-rope resistance at high speed. With an air propeller the length and weight of the vessel can be reduced, bringing it into the best form as regards water-resistance and seaworthiness. The invention is also of special advantage for the navigation of rivers and canals, where steamers heretofore have generally been at a disadvantage. The swivelling propeller at the stern is of especial advantage as a means for providing auxiliary power to sailing vessels on board which a steam-boiler is found for working the winch and other gear. The vessel can thus be driven at a moderate speed or assisted against a light breeze. We know not but that this invention may have great effect in furthering intercourse between countries. It may also lessen



AIR SCREW-PROPELLERS.

Air Screw-Propellers for Ships.

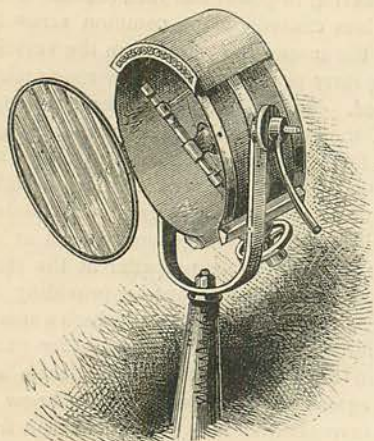
An improved method of propelling ships by means of air propellers has been invented and patented by a very intelligent Dane, Henric Christian Vogt, engineer, Copenhagen. On the deck of a ship is mounted a propeller having an outer appearance somewhat similar to a water screw-propeller, but made lighter and larger, and having two or more blades, wings, or sails. The angle and pitch of these can be changed according to the speed, and to the direction and power of the wind. Instead of one propeller, two or more may be employed—each, by preference, driven from a separate engine. In addition to these, near the stern of the vessel a smaller propeller is mounted, which, with its framing, can be swivelled laterally round a pivot for the purpose of increasing the manœuvring power of the vessel, or for assisting the steering. The blade or wing may be made in one piece, or of more than one piece united together and over-

the pain of sea-sickness, as the vessels can be built with more breadth and a keel, so helping to check the incessant and system-stirring roll over the waters. The ocean liners are at present built without keels or flanges that might check the rolling, and this because it is supposed they make greater speed, though inflicting greater discomfort on passengers. For war purposes the invention would not be of any great advantage. It is evident that so much outwork would soon be shot away, leaving a vessel that had only this system of propelling to depend upon, at the mercy of an enemy.

Celluloid Sheathing.

The *Annales Industrielles* publishes an account of some successful experiments on the use of celluloid for sheathing vessels in place of copper. The plates were put on at the beginning of this year, and, after some months, were found free from marine vegetation. The plates were one millimètre thick.

An Electric-Light Raft.



A pontoon raft carrying a steam-engine, dynamo, and electric lamp, with a projecting apparatus, has been introduced for the purpose of navigating narrow or unknown channels at night. The raft floats in front of the vessel, and may be propelled by the latter, or by its own engine, as required, since it is a steam-raft, and fitted with a propeller. Ordinarily the engine drives the dynamo, and supplies electricity to the lamp, which is regulated by hand. The figure shows this projector with the glass lens or lid open. Another device for enabling ships to navigate the Suez Canal by night, consists of a cage or suspended can, which is lowered by tackle down the stem of the ship. It carries a powerful electric lamp and projector; the carbons being in this case also regulated by hand. We may add that ship's-side lanterns, for port and starboard lights, are now made with incandescent lamps. Each lantern carries two lamps, so arranged that should one go out by accident the other is instantly lighted by an automatic action.

A Telephone Buoy.

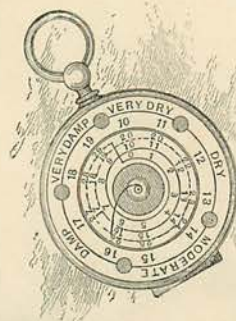
At Largs Bay, near Port Adelaide, Australia, a plan has been adopted for enabling steamers to communicate by telephone with their offices in the town. A buoy is moored in the bay at the anchorage of the vessels, and telephone cables laid to it from shore. The ends of the cables are floated above water by the buoy, and when a ship comes to anchor, a boat is lowered with a conducting-wire connection from the ship and joined to the cable to be used for speaking. In this way, by a simple operation, the telephone on board is connected to that in the office at Port Adelaide for communication.

Some Recent Books.

The Bacon-Shakespeare question has by this time nearly burnt itself out for the next few years at least, but those who care to continue their acquaintance with the recent prolific literature on this subject may like to peruse Mr. Stope's little volume on the subject, entitled "The Bacon-Shakespeare Question" (T. G.

Johnson), in the course of which much pleasant reading may incidentally be met with. The same remarks apply to the Rev. Dr. Nicholson's ingenious little pamphlet, "No Cipher in Shakespeare" (Fisher Unwin). Turning to a more practical and profitable subject, let us welcome Cassell's "Shilling Cookery," edited by Mr. A. G. Payne, well known as an occasional contributor to this Magazine. This handy little book, if we may so designate a volume of more than 350 pages, contains hundreds of useful recipes, and is indeed a marvel of cheapness. Miss Irving's story, "Six Girls" (Fisher Unwin), is brightly written and pleasantly illustrated, but we cannot say we admire the paper on which it is printed. Vastly superior in this respect is the same publisher's edition of "Æsop's Fables for Little Readers," which is very tastefully got up, and contains some really clever little pictures from the pencil of Mr. Henry Ford.

A Damp-Detector.



The danger of sleeping in damp sheets is well known, and the little appliance which we illustrate may be useful for tourists and others. It is made for the pocket, and consists of a dial having an indicator of vegetable fibre sensitive to damp. Not only does it tell a damp bed, but the humidity of a room. Care should be taken to shield it from the solar rays and actual wet. The price is stated to be moderate.

Two New Stories.

The author of "Dead Man's Rock" has given us, in "The Astonishing History of Troy Town" (Cassell), a new "character" in Caleb Trotter, who will, unless we are much mistaken, soon become a popular favourite. The stories that he tells are as original as his manner of telling them, which is far from being commonplace. How Caleb sets up a notice-board warning off ladies from the grounds of his woman-hating master, how Admiral Buzza and his daughters attempt to land there and are repulsed by Caleb, and how the master's hate is changed to love by "Tamsin" Dearlove, whom he eventually marries, is humorously told by "Q." There are a couple of scheming dynamiters in the story, too, but as their plots have no worse result for the hero and heroine than bringing about their union, perhaps they are to be forgiven. The story is highly readable throughout, but Caleb is its best character. --Stories in some such form as Baron Tauchnitz has made familiar to Continental travellers have long been wanted by English travellers and readers. Mr. Fisher Unwin is endeavouring to supply this want by his "Novel Series," the first volume of which is Mr. T. Wemyss Reid's "Gladys Fane," a work which is already widely known, but in this handy and attractive form should be even more popular.