

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.

A Glass Bird-Cage.



A cheerful bird-cage, which allows the bird to be well seen, is shown in the figure, and is the device of Mr. Ayckbourn. The sides are of glass, but the top is of wire-caging in the ordinary way. Air is admitted freely by this open dome. In other respects the cage is similar to the time-honoured patterns.

A Handy Table Easel.

A new easel, by name the "Hatherley," has lately been patented in this country, and it promises to be very useful for the display of drawings, photographs, and other works of art. When closed, this easel packs away very compactly, but the frame is so constructed that it can readily be opened instantaneously by merely pulling apart the front legs. One great advantage of this easel is that the back support is geared along with the front legs, and there is thus no danger of collapse when the apparatus is open. Indeed the opened easel is so rigid that it can with safety be used as a music-stand. Larger easels on the same principle are being made for sketching and studio purposes.

Darkness Photographs.

Captain Abney, R.E., has, it is stated, prepared photographic plates so sensitive that they are sensible to the dark heat-rays beyond the red end of the spectrum. Such a plate, used with a rock-salt lens in the camera, is believed to be capable of giving an image of a body heated, but not self-luminous.

A Railway Station Indicator.

A railway station indicator in the carriages of trains is now used on some of the American railways. It consists of a cylindrical drum, upon which are fixed slips of wood bearing the names of the stations. These are detachable, and readily replaced by others if the carriage goes to another line. The cylinder is actuated by a spring which is wound by a backward

movement of the drum. The spring is controlled by an electro-magnetic catch, which is actuated by a battery placed upon the locomotive, or in the luggage van, and which permits the movement of the drum to take place only one step at a time when the circuit is closed. The switch is controlled by the conductor or engine-driver, and a warning gong is also struck each time the change of station is indicated.

Precipitated Gilding.

A process for gilding glass, which is said to be the revival of a lost art, has been brought out recently. It consists in precipitating the gold (or silver) on the back of the glass, and protecting it from the atmosphere by a varnish.

Uses of Sugar.

Unrefined sugar has, it is said, been long used in India as an ingredient of mortar. It has been recently pointed out that cane-sugar and lime form a chemical compound suitable as a cement. Equal quantities of finely-powdered lime of a common sort, and good brown sugar mixed with water, form a mortar which has been found to join stone and even glass. The lime should be thoroughly slaked with air, for if any dry particles are left, they will ultimately swell and break the joint. Portland cement can also, it is stated, be improved by the addition of a little sugar. Sugar is also mixed with plaster of Paris in modelling—an ounce of sugar to each half-pint of water. Sugar has recently been tried in Italy with success as an anti-incrustator in boilers. Two kilogrammes of sugar were added to the water in a 20 horse-power Field tubular boiler with 126 tubes, and after forty-five days' work the boiler could be cleaned without scraping it, as the sugar detached the "scale."

Signalling by Gas.

Mr. J. R. Wigham, the well-known inventor of the Wigham gas-burner for lighthouses, has devised a new system of lighting for lighthouses, which is held to be more economical than the "group-flashing" system. The new system consists in causing the lenses to revolve, and the groups of lights to revolve with them, the relative positions of the lenses and groups being maintained. By it only two, instead of six or eight, lenses are required. By the older system these lenses revolved round a single central group of lights. Another novelty in gas-lighting is a semaphore, designed for night signalling, which was recently built at Mount Wise, Plymouth. It consists of arms 6 feet long, branching out in all directions, representing the

positions of the day semaphore. At the end of each arm are three gas-jets, which flame up when a valve is opened. The valves are worked by keys on a key-board. This device was not, it is reported, very successful when first tried; but it may contain the germ of something better. We may also mention that a portable "electric lighthouse" has been devised by M. A. Beduwe, of Liège, Belgium, the appliances consisting of the lighthouse, a car to shift it about, and a hydraulic motor to work the dynamo which supplies the current to the electric lamp.

Heat Conductors in Cooking.

Copper is well known as a conductor of heat, and a novel use of its powers in this direction is that of their application to cooking. For this purpose large copper skewers, coated with tin, are provided with hollow blackened knobs or cups, which act as heat collectors. In cooking a joint, for instance, two of the heat collectors should be thrust into it, leaving about an inch of the tinned blade, and the cup-like collector, exposed. The heat of the oven or fire then acting, during the cooking process, on the collectors, is communicated to the blades in the joint, and by them to the meat. Thus the heat is conveyed direct to the inside of the joint, and all danger of underdone "interiors" is removed. It is claimed also for this process that the juices of the meat are more effectively retained, and that as the heat is applied more thoroughly to the meat, an economy of time, and consequently of fuel, in cooking is the result. We should add that the heat collectors, or cups at the ends of the rods, are of varying shapes for use with different classes of meat and methods of cooking.



FIG. 1.

A Combination Ladder.

A ladder which can be turned into a pair of steps is shown in our engravings. The ladder is hinged or

jointed at its middle, one half being able to bend over and form the back stay of the steps, this stay itself being also furnished with rungs. The figures illustrate the method of using it in both ways.



COMBINATION LADDER.

FIG. 2.

Soap from Sheep's Wool.

The grease from sheep's wool has been utilised in making a cheap soap, not adapted for toilet purposes, by M. Robart, who recently communicated the details of his process to the French National Society of Agriculture. This grease, when brought to its point of fusion, absorbs the sulphuric compounds—for instance, sulphuric hydrogen—and so treated it becomes saponifiable in a cold state. Soap is made by this process in less than an hour, whereas soda soaps take from six to eight hours for their manufacture. The soap is, moreover, made without caustic alkali, but simply with alkaline carbonates, a fact applicable to all fatty matter when sulphurised. M. Robart recommends the soap for killing insects in vine cultivation.

Seaweed Note-Paper.

A process for making writing-paper from seaweed has been brought out in this country. The weed is boiled with carbonate of soda, and the filtered solution is treated with sulphuric acid. This yields a paste more viscous than gum arabic; and it is supposed that it can be profitably utilised. After this paste is removed, the fibrous matter left is made into paper.

What is "Massage"?

"Massage" is a new mode of treatment for certain diseases, such as writer's cramp, dyspepsia, and rheumatism, and is believed to operate by promoting circulation, absorption by the lymphatics, and electrical contractility of the muscular tissue. It is performed by *effleurage*, a stroking movement of the palm of the hand over the surface centripetally; by *pétrissage*, pressing and rolling a portion of the muscle between the fingers and the adjacent tissue; *friction*, applied by the tips of the fingers; and *tapotement*, a kind of percussion applied by the tips of the fingers.

Purifying Water by Iron.

Mr. W. Anderson, M.I.C.E., has successfully employed iron, preferably in its "spongy" form, as a purifier of water, by shaking the iron up in the water, instead of simply letting the water filter through the iron. This idea was suggested to him by Sir Frederick Abel. The water passes first into a revolving cylinder, through hollow trunnions, and the iron is showered down through the water, which afterwards falls through a height where it becomes aerated, and then filters through a sand bed. Three of these revolving purifiers are now at work in Antwerp. Mr.

Anderson believes that iron can purify almost any water for dietetic purposes.

Training Guns by Electricity.

The War Office authorities have been for some time past engaged in trying electric power in the working of guns; and it is stated that the guns of Spithead fort are to be fitted up with the new electrical training gear. Electric motors are to be worked by a large generator placed out of harm's way, a plan considered preferable to the present one of transmitting the motive-power by shafting.



FIG. 1.

A Poison-Guard.

The figures illustrate a bottle with a glass stopper, and a "stopper fastener," which prevents any one removing the stopper from the bottle, except deliberately and with both hands. The fastener is made of brass and can be fitted to any bottle,

whether narrow-mouthed or wide. When placed on a bottle containing poison it prevents the use of the contents inadvertently for some other liquid.



FIG. 2.

Meteoric Resin.

Some time ago a French *savant* picked up a curious substance, found on stones and trees after a stroke of lightning, and this on being examined by M. Stanislaus Meunier, a well-known meteorist, has proved to be a kind of resin. It burns in flame with a resinous odour, and leaves a mass of carbon behind. There are several cases on record of bituminous substances accompanying fire-balls and thunder-storms; but this appears to be the first case of the preservation of them for scientific analysis and speculation as to their origin.

Tea and Lead.

Professor Pedler, of the Presidency College, Calcutta, has made a series of experiments on the effect of lead-lined tea-chests on the tea. It has been observed that tea sometimes corrodes the lead; but Professor Pedler concludes that tea properly manufactured in the ordinary way has no power to corrode lead. If, however, unseasoned or damp wood is used for the boxes, corrosion of the lead is almost certain, some kinds of wood acting more strongly than others. Even with seasoned wood, if it becomes saturated with water, and then placed in certain favourable circumstances as regards heat and moisture, there may be corrosion. The active agent, he thinks, is produced in seasoned wood by a secondary action from the constituents of the wood. The corroding agent is usually acetic acid in the presence of moist

air and carbonic acid; but other acids of the same series are sometimes produced, and also act on the lead. The lead being thus corroded by the action of the wood, the tea takes up the disagreeable odour produced, and will thus become deteriorated.

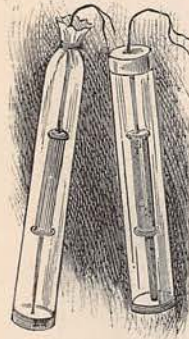
A New Hansom.

The new Victoria hansom, which combines some of the advantages of the brougham and Victoria, has been approved by Sir Charles Warren, and is now to be seen on the London streets. It can be opened or closed by the passenger at will, and is a handsome as well as a convenient vehicle. Hansoms with india-rubber tyres have also been introduced into London; the rubber rendering their travel easier.

Transparent Photographic Paper.

A transparent paper to take the place of glass plates in photography has been recently brought out. A thin homogeneous paper is treated with benzole in which some gum dammar and gum elemi are dissolved. This renders the paper at once flexible and transparent, and suitable instead of glass. They can be used to print from, and as quickly as glass negatives; and they are also said to be easily developed, fixed, and washed. Those photographers who desire portable appliances will probably find them useful. While upon this subject we may mention a new paper made at Düsseldorf. It is a gelatino-citro-chloride paper, and has the following advantages over albumenised paper for photographic purposes. It produces better prints with all the details of the negative, and is especially valuable for weak negatives, because the light parts become lighter, and the dark ones darker. The printing is also quicker with this new paper than with albumen paper, and, moreover, the prints do not fade so readily as with the latter. Any surface, according to an experienced photographer, can be obtained by its use, from the highest polish of an enamelled print to the "matt" surface of an engraving.

A Water-Cartridge.



The figure illustrates a cartridge for blasting mines, especially fiery coal-seams, which has been invented by Mr. Miles Settle, and has recently been well tried. It has even been placed in barrels of gunpowder, but it gives no flame. It is fired by electricity, and the explosive is gelatine dynamite. The explosive cartridge is completely surrounded with water, and is stated to be quite safe.

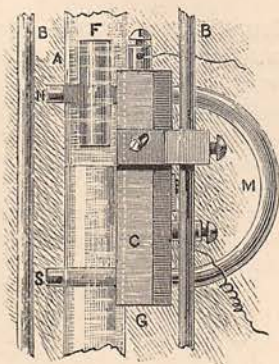
New Locomotives.

At the Baldwin Locomotive Works, United States, several novel locomotives have been constructed for use on the street railways of Minneapolis, in Minnesota. Their novel feature is the use of heated soda

in place of furnace fires. The engine will have no visible chimney, and will not emit smoke or ashes. The boiler is of copper, and contains 5 tons of soda, which, on being damped by a jet of steam, produces intense heat. The action ceases when the soda is thoroughly saturated, which takes place in about six hours. The exhaust steam from the cylinders is used to saturate the soda. The engines have about the same power as those used on the elevated railways, and readily draw four light cars. We may also mention that a locomotive propelled by gas has been at work on a street railway in Melbourne, Australia, for some months. A gas-engine is the propelling motor, and the supply of gas is contained in four copper holders, each 6 feet long and 16 inches in diameter. The gas is put in under a pressure of ten atmospheres, and there is sufficient stored to run the cars 15 miles. An engine and compressing pumps for the gas are fixed near the line, so that the locomotive can readily get a fresh supply. This use of a means of propulsion practically without weight deserves attention. At the Trafalgar Colliery an electric locomotive is in use underground for hauling the coals to the shaft. This has hitherto been done either by wire ropes, persons, or horses. The engine is the device of Mr. Reckenzaum, and is similar in character to that of his electric tramways, the power being supplied to the electric motor by means of accumulators carried on the locomotive. The electric motor is of 8 horse-power, and suitable brakes and auxiliary appliances are provided.

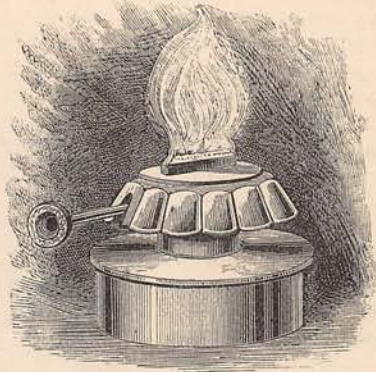
A Magnetic Boiler Alarm.

Low water in steam-boilers is ingeniously signalled by the electrical arrangement which we illustrate. The apparatus consists of a brass case C, attached to



one of the side rods B, of the water-gauge of the boiler. Through the upper and lower ends of this brass case pass the legs of a horse-shoe magnet M, whose ends project a little beyond the glass tube A. The case is fastened at such a height on the gauge screw that the upper leg of the magnet comes opposite a float F, when the water is at its normal height. The float consists of a small piece of iron encased in vulcanised india-rubber. Within the case there is pivoted a strip of iron I, which carries at its centre a platinum pin D, and attached to the inside of the insulating cover G is a small platinum contact E. The latter is connected to the binding post upon the cover, and another binding post in electrical connection with the brass case C. To both these posts or terminals are also attached the wires of a circuit containing an electric bell and a battery.

Now, so long as the water keeps at its proper level, the iron float F, being magnetised by the magnet M, attracts the upper end of the iron strip within the case, and maintains the pin D out of contact with the electrode E; but when the water sinks so as to bring the float opposite the lower leg of the magnet, the lower end of the iron strip is attracted by the float, and the pin I is brought into contact with E. This closes an electric circuit and rings the bell, thus signalling the fact of low water.



A Safety Spirit-Lamp.

A new spirit-lamp, which obviates many of the risks attendant on the ordinary table spirit-lamp, has lately been introduced. It is so constructed that there is no danger of over-filling the lamp, while a shield that surrounds the burner prevents heating of the spirit reservoir, thus guarding against two of the most fruitful sources of danger. For use on tea-tables and for bed-room kettles, these new lamps should prove very serviceable.

Christmas and New Year Cards.

The Christmas and New Year Cards issued by Messrs. Sockel and Nathan are distinguished by the great taste displayed in the selection of the designs, and the great care exercised in their production. Oval is a favourite shape with this firm this year, and they have even used ovals in their "Modern" series of autograph cards. Some well-executed "frosted" cards, and two series of views at the Colonial and Edinburgh Exhibitions, deserve special notice. Machine-frosted cards are the speciality of Messrs. Wirths Bros. Some of the views issued by them of sunsets, and other richly-tinted scenes, with sparkling foregrounds of snowy landscape, are exquisitely rendered. A word of commendation, too, is due to Messrs. Wirths' satin cards, and also to the tastefully designed backs of their cards, which are provided with messages of greeting and blank lines for the names of sender and recipient. Perhaps the most characteristic feature of this year's cards is the provision everywhere made for identifying the sender. Foremost among makers of this class of cards is Mr. J. F. Bennett, who has produced a series known as the "Visette," in which each card is constructed to hold a lady's or gentleman's

visiting card. The designs, though not elaborate, are pretty and in good taste. Too late for notice with their cards, Messrs. Hildesheimer and Faulkner have issued a charming Christmas gift-book for children, entitled "The Land of Little People," with verses by Mr. Frederic E. Weatherly, and illustrations by Miss Jane M. Dealy. We regret that space will not allow us to do more than mention, though with high commendation, a work that deserves more lengthy notice. Messrs. Raphael Tuck and Sons have issued a real novelty in the Raphael Panel, which is, so far as we have seen, undoubtedly the finest card of this season. It is a reproduction of the picture by Raphael recently purchased for the National Gallery from the Duke of Marlborough. Another striking novelty issued by this firm is the series of etchings after paintings by Constable, which are admirably rendered. Space will not allow us to mention more of Messrs. Tuck and Sons' novelties than these, but all their cards are as careful in execution as they are admirable in design.

A Lifting Shadow.

Many travellers have noticed that the shadows cast by Adam's Peak in Ceylon at sunrise, instead of lying flat on the ground, appear to rise up like a veil in front of the spectator, then suddenly to fall down to their proper level. This has been supposed to be a kind of mirage, but the Hon. Ralph Abercromby, F.R.M.S., attributes it to light wreaths of morning mist being driven past the western side of the mountain, and catching the shadow. When these move on, the shadow falls to the ground.

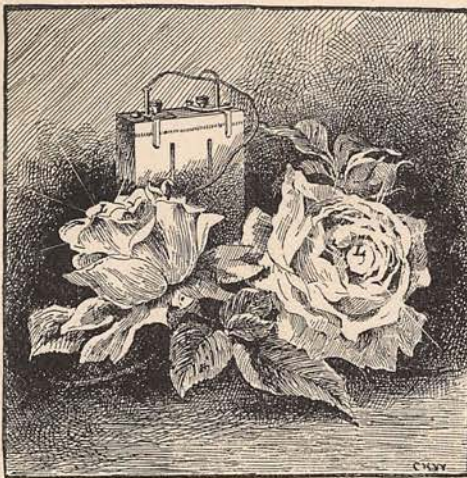
Woodite.

"Woodite" is a new material, which possesses the elasticity of caoutchouc, without, it is stated, being in-

flammable, or injured by salt water. It is proposed to use it as a fender on quays and sea-walls, in order to prevent injury by collision with ships; and also to protect the unarmoured parts of torpedo vessels. Experiments made at Dartford upon a target covered with cubes of the material, showed that shots passed through it leaving the hole closed; but further experiments with artillery are required on this point. We may add that a caoutchouc has recently been obtained from the common lettuce plant.

An Illuminated Rose.

The accompanying figure illustrates a small pocket apparatus for the electric illumination of flowers, such as roses, to be worn in the hair or on the dress. The apparatus consists of a vulcanite case containing three voltaic cells. It is only 4 inches high by 1 inch thick, and 3 inches wide, so that it may be carried in the pocket. Its weight is about 1 lb. A smaller form weighs only $\frac{1}{2}$ lb., and will go into the vest-pocket. Flexible silk-covered connecting wires lead from the poles of the battery to the tiny electric lamp L, which is placed in the interior of the flower, as shown. A switch on the box enables the light to be put on or off.



AN ILLUMINATED ROSE.

THIRTY-FIVE POUND STORY COMPETITION.—*The Editor much regrets to have to announce that no manuscript has been found worthy to receive the Prize, although over fifty were submitted. The Prize will, therefore, be offered for a further Competition, the particulars of which will be announced in due course.*

A new series of Competitions, open to all readers of this Magazine, is in course of preparation, and will be announced later in the volume.

SPECIAL AMERICAN COMPETITION.

IN view of the growing number of our readers in America, and of the fact that they stand at a manifest disadvantage in respect of several of our Competitions already announced, which are more suitable to our readers in Great Britain, we have been induced to offer an Extra Prize of \$25 for the best practical paper on THE DOMESTIC SERVICE DIFFICULTY IN AMERICA, with Suggestions for its Solution. The paper should contain not less than 2,000 words, and must not exceed 3,000 words in length. Each MS. must be accompanied by a declaration that it is the writer's unaided work, countersigned by a clergyman or other person of responsible position.

The Competition will be conducted in accordance with and subject to the General Rules of our Competitions, as given on page 448 of our last volume, 1886.

All MSS. must be sent, prepaid, to *The Editor of CASSELL'S MAGAZINE*, Cassell & Company, Limited, 739, Broadway, New York, not later than March 1st, 1887.