

## THE GATHERER.

### An Aërating Flower-Pot.

The illustration shows a new flower-pot, by which air is supplied to the roots of a plant, and the usual shoring of broken sherds and gravel in the bottom dispensed with. In the sides of an ordinary flower-pot, A, two or more apertures are made, and earthenware orzinc tubes, B B, inserted



in them. These tubes have air-holes round them, as shown, and the air is thus allowed to reach the plant-roots. A bracket, C, is sometimes added to support the tubes in the middle when they are not supported by the walls of the pot. This plan facilitates the uprooting of plants. Orchids and some other plants are fostered by warm air entering the soil at their roots in this way.

### A Treasure-Safe.

Mr. Vanderbilt's money-coffer is a "strong box" indeed. It is at once fire, water, and burglar-proof; and, really, a place where a hundred million dollars was recently stowed away is certainly worth fortifying. Mr. Vanderbilt's safe is, accordingly, the most impregnable fortification on the American continent. Its foundations are blasted out of rock, the front wall is 5 feet thick, the side and rear walls 3 feet thick, of pressed brick and brown stone. The beams, girders, and main pillars are of iron encased in fire-proof material. The doors, window-frames, and partitions

are of iron, marble, and glass. No wood enters into the structure. The great money-vault measures 36 feet by 42 feet, and is built of wrought iron and steel. Its outer doors weigh 8,200 lbs. each, and are fitted with the most approved modern locks and alarms. Moreover, a massive wall of masonry surrounds the iron lining of this treasure-cave.

### Electric Light Spectacles.

The introduction of the electric light has led to some discussion as to the danger to the eyesight produced by the brilliant lamps. No doubt the electric light is an object to stare at, at present, and staring at the lamps is not conducive to the health of the eye, unless the lights, as is now the case with all arc and some incandescent lamps, are shaded by ground or opal glass globes. When, however, the light ceases to be a novelty, people will not stare at it any more than they stare at the sun or a gas-jet. For electric light engineers, however, the case is different, and therefore the coloured spectacles introduced by Dr. W. H. Stone, F.R.S., are likely to be useful. These spectacles have blue glasses in front and red or "blinker" glasses at the side, which can be folded down over

the blue ones. The glasses are selected and combined by aid of the spectroscope, and thus the proper tints are obtained. The incandescent lamp is to be looked at through the blue glasses, the arc through the blue and red together, because it is the red rays which are likely to cause injury to the eye in the incandescent lamp, and the blue or violet rays in the case of the brighter arc lamp. These glasses temper and cut off the dangerous rays in the two cases. Persons with weak eyes may find such glasses useful.



A GREENHOUSE HEAT-ALARM.

### A Greenhouse Heat-Alarm.

An electric apparatus designed to announce that the temperature of a greenhouse has risen to an undue height, has recently been introduced. As shown in the illustration, it consists of a Leclanché voltaic cell,



C, in circuit with an electric bell, B, of the "owl" pattern, recently alluded to in the GATHERER, and also with a case, A, containing a mercurial thermometer, in which the rise of the mercury column to a certain height completes the circuit between two wires fused into the mercury tube, and thus causes the bell to ring when a certain temperature has been reached.

#### A Sewer-Gas Cremator.

At the International Health Exhibition, Mr. Samuel C. Dean exhibited a "sewer-gas cremator," called the "Parcæan," consisting of a light sheet-iron or earthenware cylindrical casing, the upper part of which is filled with asbestos or other refractory substance. This is kept at a temperature of 500 degrees Fahrenheit by a gas-jet, and the escaping foul air or gas from the sewer is caused to pass through the asbestos, where any infectious germs are burnt up or "cremated." A fine wire gauze is placed at the top and bottom of the apparatus, the latter to guard against mishap in the event of there being an accumulation of explosive gas in the sewer. The apparatus may be used as a ventilator on the roofs of hospitals, and also in chemical works, for destroying germs and effluvia. It is said that a Parcæan two feet high and nine inches in diameter will disinfect over 20,000 cubic feet of air in a day.

#### A British Biological Station.

A movement has been set on foot to inaugurate a marine biological station, with well-equipped laboratories, at a suitable point on the English coast. Already the Granton establishment, which we mentioned in a recent number of the GATHERER, has borne fruit in assisting the Scottish fishermen, and even if no important practical end immediately results from the new station, the interests of pure biological science cannot fail ultimately to be furthered by it. The station will be erected at a point rich in marine life; and though no place is fixed as yet, Weymouth and Torquay are mentioned. We are behind other nations in matters of this kind, although our fishing interests and facilities are so great.

#### A Novel Fire-Escape.

Our illustration represents a new fire-escape invented by Mr. D. Ware and Mr. C. W. Richman, of Philadelphia. As shown in Fig. 1, it consists of a long rope with a hook at one end and a board, B, with six pegs, P P, on it, round which the rope is twisted in the manner shown. Friction-brakes are also brought to bear on the rope at the ends of the board. The object of this board is to keep the person from descending too fast along the rope, the friction-pins and brakes rubbing on the surface of the latter. To use the escape the hook is caught in the window-sill and the rope thrown out to the ground. The person gets into the

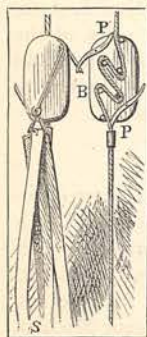


FIG. 1.

saddle or belt seat, S, attached to the running-board, and the rope is twisted round the pins of the latter as shown. Then the person steps off the window and descends in the manner illustrated



FIG. 2.

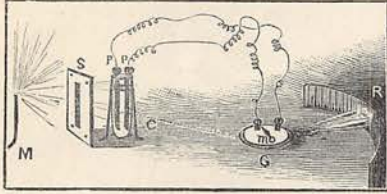
in Fig. 2, all the while controlling the brakes on the board with his hands. These brakes are so powerful that he can not only moderate the speed of his descent, but stop himself on the way if he chooses. On reaching the ground the rope with its saddle and board is drawn up to be used by another person. The device goes into a small space and might be furnished to every bedroom, or, at least, every storey of a dwelling-house or hotel, just as life-belts are furnished to a ship.

#### An Electrical Actinometer.

At a recent conversazione of telegraph engineers and electricians, held in King's College, London, Professor G. Minchin, of Cooper's Hill Indian Engineering College, exhibited a very ingenious apparatus for measuring the actinic effect of sunlight, or any other powerful light. It consisted of a new photoelectric cell, which he has discovered, a reflecting galvanometer, and a screen, or shutter. A photoelectric cell is a combination which generates electricity like a voltaic battery when light is allowed to fall upon it. The peculiarity of Professor Minchin's new cell is that it only generates electricity when blue light falls upon it, or, at least, light containing a proportion of blue rays; as, for instance, ordinary sunlight, or the light of a burning magnesium wire, which is of all artificial lights that most like sunlight in the proportions of its rays. Professor Minchin's cell consists of a glass test-tube, C, containing two parallel strips, or plates, of tinfoil, P P, kept apart by a cork, which closes the mouth of the tube, but permits the plates to be connected to two wires in circuit with a



sensitive reflecting galvanometer, G. The tube is filled with pure alcohol, and has some crystals of nitrate of ammonia in the bottom. A shutter, S, with a slit in it is placed in front of it, and when a ribbon of magnesium wire is burned in front of the slit, the ray passing through the slit and falling on the tinfoil excites a current in the cell, which, traversing the coil



of the galvanometer, deflects the needle and mirror, *m*, of the latter, and causes a ray of light from a lamp reflected from the mirror to move up or down the scale, *R*. The deflection of this ray in degrees of the scale measures the intensity of the current in the galvanometer, or, in other words, the intensity of current generated by the cell, and as this is proportional to the actinic strength of the light, the reading on the scale is a measure of the latter. When red glass is placed in front of the screen to cut off the blue or actinic rays, the ray of light on the screen remains still, showing that there is no current generated in the cell by red light falling on it. When the actinic effect of light is required for an interval of time, Professor Minchin uses a clockwork device to expose the cell to the light for that interval of time only, and the current generated meanwhile is stored in a "condenser," then discharged at once through the galvanometer, giving a deflection proportional to its amount.

#### An Oxide Gas-Burner.

The figure illustrates a new kind of gas-jet invented by Herr O. Fahnehjelm, of Stockholm. A finely-



powdered refractory oxide (such as the oxide of magnesium, calcium, zirconium, or silicon) is mixed with a solution of starch, gum, or other gelatinous substance, and the plastic mass is reduced to the form of a wire by being pressed through a die, and then cut to the desired lengths, dried, and burnt at a high temperature. These wires are fixed in an iron or brass socket, *F*, making a sort of

brush. The filaments of oxide are then exposed to the high temperature of a water-gas-flame, the gas being burned in an ordinary burner, *B*, shown beneath. The oxide brush, supported over the gas-flame by a twisted wire, glows with an intense white heat, and yields a beautiful soft light.

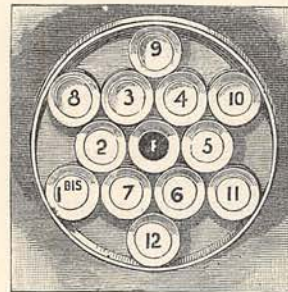
#### Lightning and Electric Light Wires.

During a musical festival recently held in the Drill Hall at Minneapolis, in the United States, a

thunder-storm arose and the building was struck by lightning, which, attracted by the metal ball on a flagstaff over the entrance, shattered the staff, and traversing an iron bolt in some timber-work, escaped to earth by some bare electric light wires which entered the building to the electric lamps within. The accident shows that naked electric light or telephone wires may become a source of danger to a building unless proper care is taken by the electricians in erecting them, for they act as a partial lightning-rod, and a partial lightning-rod is sometimes more dangerous than none at all, since it is apt to invite the discharge by providing for it an avenue of least resistance to the ground. These wires should therefore be run into buildings at points removed from spires, flagstaves, or other prominent parts of the building likely to draw the discharge, unless the prominent parts in question are actually connected by a suitable metal wire to the electric light wires, so as to guide the discharge into the latter without allowing it to break through any part of the building itself. We may add that a workman of the electric light company, while engaged in splicing the wires during the thunder-storm at Minneapolis, was rendered insensible, and on coming to felt an intense pain in his right foot. On examining the latter he found that his leg had been struck below the knee, and his clothing torn to shreds, his boot split open from toe to heel, and his foot blistered as if it had been burned.

#### The Packer's Puzzle.

A new French puzzle, called "Le Secret d'un Emballeur," or the Packer's Puzzle, consists of a circular



tray of cardboard with a rim round it, and twelve discs of hard wood which are placed in the tray. The puzzle is so to arrange these that they will help to bind one another and allow the tray to be inverted without their falling out. The plan of arrangement to effect this is shown in

the figure, where No. 1 is in the centre and Nos. 2, 3, 4, 5, 6, 7 are arranged round it. Then the left hand is placed flat over the pieces, and Nos. 8, 9, 10, 11, 12 are inserted so as to bear on the sides of the box. Finally, No. 1 is removed from the centre and placed at the position marked No. 1 Bis. The twelve pieces are then fixed, and the puzzle solved.

#### The Steno-Telegraph.

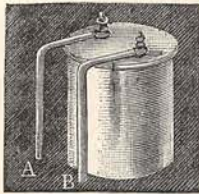
Signor Michela, of Ivree, has set himself to introduce what may be called a telegraphic shorthand. In the present system of telegraphing, the average English word requires some fifteen distinct signals to send it, the average letter requiring three, and the average word consisting of five letters. Now Signor Michela proposes to telegraph, by means of a key-board instru-



ment like a piano, any speech in any language as fast as it can be spoken, and as it is delivered by the speaker. His apparatus has been tried in the Italian Senate, and is said to be capable of sending 10,000 words per hour. Full details of the apparatus would require a long article to describe, but the principle of its action is to telegraph the phonetic sounds common to every language by means of signals, and not the letters, as in the present system. The operator catches these sounds in a word, and telegraphs them by pressing down the keys. At the receiving station they are represented by short horizontal lines on a moving strip of paper. Signor Michela's telegraph is a new departure in a promising direction, its only drawback being that it requires a longer time to learn than the ordinary system.

#### A Standard Ohm.

Now that there are so many amateur electricians, the standard "ohm," or unit of electrical resistance, which we illustrate, may be useful to non-professionals. It consists of a coil of insulated wire giving the unit resistance, enclosed in a neat boxwood box, with an ebonite top to insulate the two terminals, A B, from each other. The ends of the wire coil are soldered to these two terminals, which are stout copper bars, intended for plunging into "mercury cups" to make the connections with the battery and other apparatus. Each coil is tested and guaranteed at the Cavendish Laboratory, Cambridge, and a written guarantee given that it is correct to  $\frac{1}{10000}$ th part of the true ohm. This true or legal ohm was defined recently by the International Congress of Electricians, Paris, as the electrical resistance of a column of pure mercury one millimetre square and 107 centimetres long. Science teachers may also profit by the new and inexpensive standard ohm thus introduced.

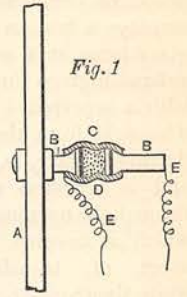


#### Motion Drawings.

In the Machinery in Motion department of the International Health Exhibition, some novel "motion drawings" were exhibited. These include drawings of the steamship *Ravenna*, showing the relative movements of the cranks, pistons, and other parts of the engines, at any part of the stroke. Another example is a drawing of the London, Brighton, and South Coast Railway Company's powerful engine the "Gladstone." It is intended for schools of instruction in mechanical science. These motion drawings, built up of movable parts which play as in the actual engine or machine, are a great help to engineers as well as to students of mechanics and physical science, since they exhibit the action of an apparatus on a plane surface, which makes them more readily understood than the cubical forms of the actual machine. Moreover, they are inexpensive, as compared with wood or metal models made to scale, and, therefore, can be obtained by institutions which could not afford the latter.

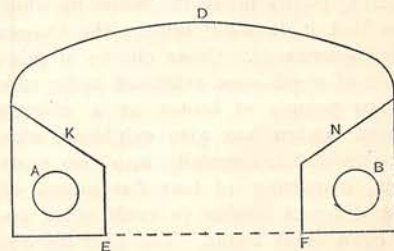
#### An Osmium Telephone.

The metal osmium, which is rare at present, and therefore rather expensive, has been found by Mr. George Lee Anders to make a good telephone transmitter of the microphone order when broken into grains, and contained in a box between two aluminium or platinum electrodes, and bodily attached to a sounding-board or diaphragm, which receives the speaker's voice. The figure illustrates this arrangement in section, where A is the diaphragm, shown endwise, BB the two metal electrodes, and CD an ebonite or wooden box or chamber, containing the granulated osmium. The wires EE convey the current through the osmium by means of the electrodes BB, and when the speaker's voice vibrates the diaphragm A, the loose metal grains in the box CD are agitated accordingly, and act as a microphone on the current, modifying it in sympathy with the waves of sound. This current is sent through the primary circuit of an induction coil, and the secondary circuit of the same coil is connected in circuit with the telegraph line. The vocal currents pass along the latter to the receiving telephone, and make themselves heard as speech.



#### A New Pipe-Joint.

There is great difficulty in preserving watertight the joints in stoneware pipes and conduits. Mr. Stanford has, however, devised a means of casting both on the spigot and faucet (that is, the entering end and the receiving socket) a jointing composition specially made for the purpose, and carefully turned afterwards to make the joint fit watertight. The joints are more easily made on this plan than on the old, and the composition is said to resist, not only water, but heat and acid. While upon this subject, we may mention the new "Petrosilicon," or artificial stone pipes exhibited at the Health Exhibition. This silicated stone is made of natural stone, such as Kentish rag and granite, broken in a crusher, and mixed with Portland cement. The compost is moulded in shapes, which give it a jarring, or settling motion, and the forms are then steeped in a solution of silicate of soda, to complete the hardening process.



#### A Non-Actinic White Light.

The low red light employed by photographers to develop their gelatino-bromide plates is very injurious

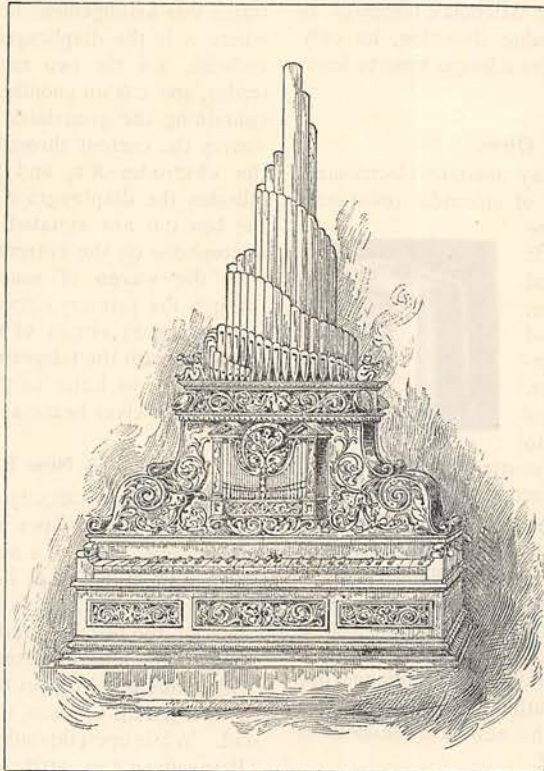


to the eyes. Mr. W. E. Debenham has, however, introduced a method, outlined in our sketch, whereby he obtains an agreeable white non-actinic light, composed of complementary red and green rays. He employs a lantern consisting of two lamps, A B, with glass faces at K and N. The glass at K is of a deep yellowish-green tint, whilst that at N is of a red colour, with a superposed pane of very pale yellowish-green. The light from these lamps falls on the curved reflecting surface, D, which is of a deep yellow colour, and is reflected down through the opening, EF, which is covered by a sheet of translucent white tissue-paper. The light, after passing through this paper, was nearly white, but had so little actinic effect that a very sensitive plate, placed at reading distance below it for a quarter of an hour, showed scarcely a trace of an image. When a yellow fabric was substituted at EF, an hour's exposure failed to produce more than the slightest mark on the plate, whilst it gave sufficient light to work by.

#### A Marble Churn.

At the International Health Exhibition there are exhibited several novel churns, one being of glass, thus showing the process of butter-making, and another of cool marble. The latter was of the eccentric type, having projecting bosses inside. The journals on which the barrel revolves were placed eccentrically, and not opposite each other, so that the churn revolves on an imaginary line diagonal to its axis. It is claimed that the projecting points break the butter up while in the churn, so that it does not require the same amount of working afterwards. Other churns of this species were made of wood—one exhibited being capable of making 150 pounds of butter at a churning. A "diaphragm" churn was also exhibited, which had its barrel divided horizontally into two parts by a diaphragm, consisting of four flat pieces of wood placed at different angles to each other and held together by a stout frame. The pins on which the barrel revolves do not run on bearings, but are mounted on friction-wheels, held in position by a slotted guide. The diaphragm acts as a beater. A more interesting churn exhibited was, however, the "Hathaway," which

consists of an oblong, flat-sided box, supported in the centre by an oscillating iron rod, which, with the containing vessel, forms an oscillating pendulum. The vessel has attached to it, at one end, a crank, the revolution of which causes the ends of the box to rise and fall at the same time that it oscillates on the pivot formed by the attachment of the rod. The upper part of the box is curved at each end, and in this way a movement is given which causes two constantly falling streams of cream to meet each other in the centre of the churn. In designing a good churn, the object is to produce a commotion which will cause the fatty particles of the cream to adhere together and form butter, and in the Hathaway churn this is excellently done by the meeting sheets of cream, without the necessity of beaters. Indeed, the churn may be run with the lid off.



A NEAT PARLOUR ORGAN.

#### A Neat Parlour Organ.

Our engraving represents a very pretty design for a parlour organ, taken from one actually made in America, the pipes being of silver. The design is worthy of imitation, if only to add variety to the existing shapes of such instruments.

#### Damp Proof Paint.

Some samples of a new paint exhibited at the Health Exhibition are worthy of remark.

The "magnetic oxide of iron paint," as it is called, is intended to prevent damp in walls. This oxide of iron is not attacked by rust, and the paint made from it is also unoxidisable, and proof against the sulphurous acid fumes given off by gas-jets. The paint is applied to a wall before the paper is put on, and, from the sample walls shown at the Health Exhibition, which were all exposed to the percolation of water, the paint appeared to serve its purpose very well.

#### PRIZE COMPETITIONS.

*The Editor hopes to make the award in the Story Competition, which closed on September 1st, very shortly.*

*Particulars respecting other Competitions, now open to all readers of the MAGAZINE, will be found in the June (1884) number.*