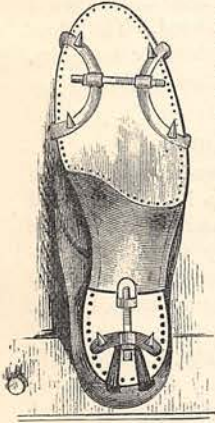


THE GATHERER.

AN ILLUSTRATED RECORD OF INVENTION AND DISCOVERY.*

A Removable Cricket-Spike.

A cricket-spike which will fit any ordinary walking boot or shoe has been introduced, and is illustrated here. The device will be understood from the woodcut, which shows the way it catches on the sole and heel and is screwed on tight. It can be adjusted to the feet in a minute or so, and is likely to be useful in "practice."



A New Use for Asbestos.

In dyeing and printing cotton cloth it is often necessary to hang the fabric in loops from parallel rods, in order to expose it to the action of steam, air, or ammonia. This has hitherto been done by means of ropes or strips of cloth; but the vapours soon rot these, and hence asbestos binders have been employed instead with great success, as the corrosive fumes have no influence upon them. Larger ropes or belts of this material have also been used for the transmission of power through rooms exposed to great heat.

The Colour of the Sun.

According to the recent researches of Professor S. P. Langley, made on the summit of Mount Whitney, in Southern California, where the atmosphere is remarkably dry and clear, the solar light is robbed of a large proportion of its blue rays by passing through the earth's atmosphere. So much is this the case that Professor Langley concludes the extra-terrestrial sunlight, or, in other words, the real colour of the sun to be bluish. The rays of the electric arc light have likewise a bluish tinge in some instances. Professor Langley also found a new invisible heat-spectrum beyond that already discovered. This fact alters our former estimates of the quantity of solar heat received by the earth. He estimates that it is capable of melting a shell of ice sixty yards thick annually over the whole earth, or, in practical terms, of exerting upwards of one horse-power for each square yard of the normally exposed surface. The total loss of heat by absorption of the atmosphere is also, according to Professor Langley, double that of previous suppositions. These results were obtained by the new instrument for measuring temperature invented by Pro-

fessor Langley, known as the Bolometer. It operates by the changes in an electric current flowing through very thin steel or other metal plates, exposed to radiations. Heating such plates increases their resistance to the passage of the current, which is consequently weakened, and thus produces a deflection of the needle of a galvanometer in circuit with it. Some of the thin steel plates or strips used in the bolometer are only $\frac{1}{15000}$ inch thick. It may be added here that platinum wires can be drawn so thin as to be invisible to the naked eye. The draw-plates for such wires are usually made of ruby or sapphire; the process of drilling the draw-holes being a very delicate one. Such fine platinum wires are also used for surgical operations, the wire being heated by an electric current and searing as it cuts.

A Self-Charging Accumulator.

The new Auto-accumulator of M. Jablochhoff charges itself without the aid of a separate primary battery or dynamo machine. Each cell consists of a shallow tray of hard impervious carbon of square form, as shown in Fig. 1. The pores of the carbon are filled up by steeping it in petroleum and afterwards baking it. The bottom of this tray is sprinkled with zinc or iron turnings as the case may be; iron of course being the cheaper metal, but yielding a somewhat lower



electromotive force than zinc in the accumulator. Two squares of coarse canvas steeped in a solution of chloride of calcium are then placed over the turnings, and over these another square of linen also moistened with the solution. These absorbent fabrics serve to separate the two plates of the couple. The bottom tray forms one plate; the other consisting of a series of porous carbon tubes tied together as shown in Fig. 2, and making an oblong plate which is placed above the moistened cloths. These pipes are made of soft carbon and are rendered especially porous by the process of manufacture.

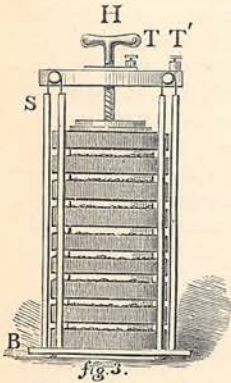


The cells thus formed are built up one above another as in the original pile of Volta. Fig. 3 shows a set of ten cells resting on a brass base B, and confined between four corner standards S. Each standard consists of a bent wire sheathed in india-rubber, and forming an arch or loop across the corners of the pile of trays, which are thus held in position. A small screw-press at the top of the pile is worked by the handle H, and serves to hold the cells well together in a vertical direction and insure good contact between them. The current is led off by the screw terminals of the pile T T¹, of which T is in metallic connection with the upper, or tubular, pole of the battery through the screw of the press, and T¹ is connected to the lower, or

* 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.

tray, pole of the battery through the wire loops or standards *s*, which are bared at the top and hook on to brass buttons projecting from the cover of the pile, and in metallic communication with the terminal *T'*.

According to the inventor's explanation, the accumulator produces alternately a primary and secondary current. Hydrogen is liberated by the action of the zinc and polarises the carbon tray, while oxygen is absorbed by the porous tubes. The two carbon plates thus "polarised" yield an electric current when connected in circuit; and the current is maintained until the plates are "depolarised." It is then necessary to break the circuit by disconnecting the plates, and allow the battery to rest and re-charge itself by the decomposition of the zinc.



The cells hitherto made are each about 4 inches square and 1 inch deep; so that a pile of ten rises about a foot high. Two of these piles, one to rest while the other is in action, are said

to be capable of maintaining an incandescent lamp alight for 24 hours without renewing the solutions. The latter operation is performed in a simple manner by first immersing the whole pile bodily in clean water and allowing it to drip, then plunging it bodily in the solution of chloride of calcium. When the zinc or iron is consumed the battery requires to be dismantled altogether, and built up again with a fresh supply of zinc or iron.

It is easily cleaned and refreshed with solution; it is compact and portable; and, unlike most primary batteries, it is free from strong odours. The fact, too, that scrap metal, whether zinc or iron, in the form of turnings, filings, or clippings, can be used in the battery instead of cast plates, is in its favour from an economical point of view. The initial electromotive force of a cell is given as 1.6 volts for zinc clippings, and 1.1 volts for iron.

Artificial Earthquakes.

Professor Milnes, of Japan, has recently investigated the propagation of earth-waves by means of artificial earthquakes, produced by the explosion of dynamite or the fall of heavy weights. Weights of 1,700 lbs. and upwards were dropped from heights up to 40 ft.; and different charges of dynamite were exploded by electric fuses at various depths under ground. The general results arrived at are that hills have but little effect in stopping earthquakes; whereas excavations exercise considerable influence in stopping them. In soft, damp ground, vibrations are easily produced of large amplitude and considerable duration; in loose, dry ground, an explosion of dynamite yields a disturbance of large amplitude but short duration, while in soft rock it is difficult to produce a disturbance of amplitude sufficiently great to be recorded on the ordinary seismograph. The velocity of transit de-

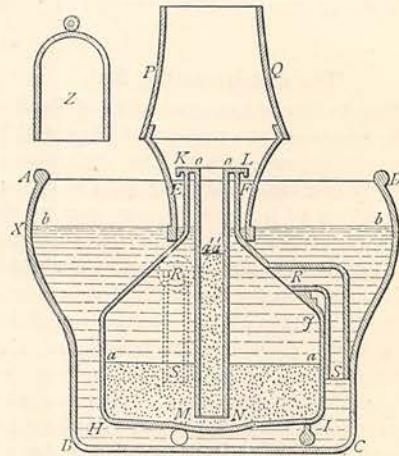
creases as the disturbance radiates. Velocities of from 200 to 630 ft. per second were measured by Professor Milnes; but other observers have determined velocities up to 8,800 ft. per second. The movement of the ground towards the origin of disturbance is very rapid, and probably the most destructive.

Sea-Weed Paper.

A Japanese inventor is stated to have discovered a method of making paper from sea-weed. The paper is said to be capable of use as a substitute for glass, and may be tinted so as to imitate stained glass.

A Disinfecting Lamp.

Experiments at Paris having shown that bisulphide of carbon is a good disinfectant, a lamp, illustrated herewith, has been devised for enabling it to be burned with safety, as it is very volatile and inflammable. The lamp is of copper, and consists of an outside vessel, *A B C D*, containing the lamp, *I H E F*. Three bent copper tubes, *R S*, pass through the sides of the lamp; and the cylindrical tube, *K L M N*, containing a cotton wick, reaches from the top to the bottom. A copper chimney, *P Q*, surrounds the flame. The lamp is filled with bisulphide of carbon to about the level *a a*; and the outer vessel is filled with water to about the level *b b*. By means of the bent tubes, *R S*, the water passes into the interior of the lamp and



forces the bisulphide up to the level *a' a'*, in the copper tube, where it is absorbed by the wick and can be ignited at the top of the tube, *o o*. As the bisulphide burns away it can be replaced by the water, and the lamp finally extinguishes itself. The combustion can be regulated by adding more or less water, so as to raise or lower the level *b b*. The bisulphide is surrounded by water, which keeps it cool, and only a little at a time is brought into contact with the flame, so that the danger from explosion is guarded against. In disinfecting a room by means of this lamp about 1 lb. of bisulphide of carbon is allowed to every 1,000 cubic feet of space. Any coloured materials likely to be bleached by the gas

should be removed, the bisulphide ignited, and the room tightly closed. After several hours' disinfection the room should be well aired, care being taken not to inhale the gas.

tried successfully in canning fish, and has none of the poisonous properties of the chloride of zinc in common use.

Kendall's Electric Generator.

A new electric generator invented by Mr. J. A. Kendall is shown at the International Inventions Exhibition. Its action is based on the fact that hydrogen passing through properly connected platinum plates at a red heat generates an electric current. The apparatus is shown in the accompanying figure, where K is a platinum tube $2\frac{3}{4}$ inches long and $\frac{3}{8}$ inch in diameter, closed at the bottom, and enclosed in a second platinum tube D, a layer of fused glass being interposed between. These two tubes form the heart

of the generator, and are connected together like the plates of a voltaic battery by external wires, J J, one of which is the - (negative), the other the + (positive) pole, as shown. A communicating pipe, H G, conveys hydrogen continuously to the interior of the inner platinum tube; and a gas furnace, A B, is employed to heat the tubes red-hot. The other parts of the apparatus consist of supports and guards I E C. In the action of the battery the hydrogen passes into the inner tube K, and seeks a way through the pores of the metal, its passage being accelerated by joining the wires J J, and thus completing the circuit. The gas is, so to speak, filtered in passing through the metal, and the residual combustible gases left inside can be drawn off by the tap F, and used, if need be, to feed the gas furnace. Such cells can be connected together like those of a voltaic battery, and a group of them can be heated by the same gas or coke furnace. Mr. Kendall proposes to use the generator for a variety of purposes, such as driving launches or sewing machines; and even for electric lighting. He estimates that a ton of coke used in heating the battery will give at least three times the electrical energy which would be produced by the same quantity of coke in working a steam-engine and dynamo.

A Harmless Soldering-Flux.

Lactic acid and glycerine, mixed with water in the proportion of 1 lb. of each to 8 lbs. of water, make a soldering mixture for tin cans in which fruit, flesh, or vegetables are to be contained, which is reported harmless from a health point of view. It has been

Dyeing by Pressure.

A method of dyeing fabrics by forcing the dye liquid into the tissues under hydraulic pressure has been introduced by M. Obermaier. The apparatus consists of a cylinder with double sides, between which the fabrics are placed. The cylinder-walls are perforated, and through the perforations the dye liquid is forced by hydraulic pressure from the inside outwards, so that it passes through the fabrics. The waste liquid is drawn off and preserved for repeated use. In fact, a regular circulation of the liquor is maintained until the dyeing is complete.



A Portable Fire-Escape.

The figure illustrates the use of a new portable fire-escape which only weighs 7 lbs., and can be carried in a carpet-bag. It consists of a strong rope, with a hook attached, which is wound on a reel ready for use. On this rope is a friction pulley-block furnished with a lever handle, to which are affixed strong loops on which the person sits. After the hook is fixed in the window of the house (for example, round the sash) the rope is dropped to the ground, and the person sitting on the loops works the lever handle and lets himself slide down the rope in the manner indicated in the illustration.

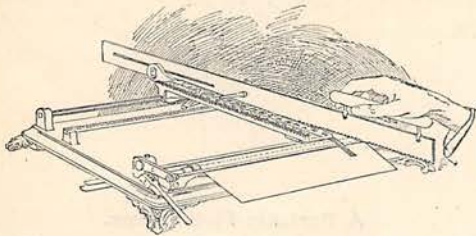
A Photograph of Lightning.

Probably the best photographs yet taken of the lightning-flash are those of Dr. Kayser, recently exhibited before the Society for the Furtherance of Photography at Berlin. One of these photographs showed

a flash of lightning that was seen on July 16th, 1884, and had an estimated thickness of four feet across the main stream or discharge. The photograph of this stream magnified four times by a lens shows that the stream consists of four distinct parallel currents, with alternate dark and bright stripes between the first and second currents. The second and third streams were very close together, but there was a wider interval between the third and fourth. Dr. Kayser thinks the flash consisted of four discharges, or a flash passing and repassing between the cloud and earth four times. The striated appearance of lightning photographs has not been clearly shown before these examples; but the subject is a very recent one.

A Pile Telegraph Post.

The telegraph posts adopted for the Suakim-Berber line were supplied by Messrs. Siemens Brothers, and made of iron; a dwarf pile of iron with a pointed end being first driven into the ground. This pile is made hollow, and is driven forcibly down by means of an iron rammer. The post proper is a tall, tapering wrought-iron tube, which is bolted to the top of the pile. At its upper end the cross-arm, insulators, and wire are fixed. One or two men can erect one of these poles in a few minutes, and, the earth not having been excavated at the base, the wire can be strung on it at once. A short lightning-rod projects from the top of the pole. The iron, not being attacked by white ants, is well adapted for tropical countries.



A New Type Writer.

The "Hammonia" type writer which we illustrate weighs only 14 lbs., and is therefore convenient in point of size, and is moreover comparatively cheap. It has the advantage also of yielding a number of copies at once by means of carbon paper. The apparatus is worked in the manner shown; but it is needless for us to enter into a detailed account of its mechanical construction. This new type writer is said to print more quickly than an ordinary penman can write in the usual way.

Bleaching Ivory.

Ivory scales, paper-knives, and so on, may be cleaned by scrubbing them with a new soft tooth-brush, soap, and tepid water; then dry the ivory and brush well; dip the latter in alcohol, and polish the ivory until it

has regained its former sheen. If the water gives the ivory a yellowish tint, dry the object in a heated place. If age has yellowed it, place the object under a bell-jar with a small vessel containing lime and muriatic acid, and set the whole in the sunshine. Care must be taken not to inhale the fumes given off during the operation. The chlorine restores the ivory to its pristine whiteness.

An Electric Winch.

The Chemin de Fer du Nord of France has adopted an electric winch for use at the goods depôt at La Chapelle, Paris. It consists of a four-wheeled truck, carrying a winch with its lifting chains, together with four Siemens dynamos, two of which are used to propel the truck and two to work the winch. The truck is moved and the winch turned by means of endless chains; but full particulars of the application are not yet forthcoming.

Chinese Fruit Soap.

At a recent meeting of the Linnean Society of London, Mr. F. B. Forbes exhibited some specimens of vegetable produce used by the Chinese in lieu of soap. The leaves of the *Hibiscus syriacus* and *Gingko biloba* are sometimes used by them for washing the hair, but the favourite soap is the fruit of a species of *Leguminosa*, called by the Chinese "feit sao-ton," or fat black beans. It is said to be a plant of the *Gymnocladus chinensis*, of which there is a specimen at Kew Gardens. The pods of the *Gleditschia chinensis*, called "tsao-chia," are also used for soap. The *Gymnocladus* pods are roasted and kneaded into balls, while the *Gleditschia* pods are broken into small bits, and soaked in boiling water until an oily substance is extracted, when the water is ready for cleansing purposes. The fruit of the *Sapindus mukwinsi* is also converted by the Chinese into a soap.

Nickel Crucibles.

Crucibles of nickel have been introduced into some chemical laboratories in place of the silver ones employed in melting caustic alkalies. They are said to be less expensive, and capable of withstanding a higher temperature than the latter.

Cocoa Gunpowder.

"Cocoa" gunpowder, so called from its warm brown colour, is a new explosive, hitherto made at Westphalia Mills, Cologne, but in future to be also made at the British Government Mills, Waltham Abbey. The chief advantage of the new gunpowder is that it makes very little smoke, and it also gives very steady and powerful effects. During recent trials at Woolwich ten rounds were fired from an 11-inch breech-loading cannon with a charge of 295 lbs. of "cocoa" powder and a 655 lb. projectile. The muzzle velocity of the shot was from 2,002 to 2,010 feet per second.

A Lighted Watch-Case.

This little device is due to Mr. Samuel Peel, and the figure will explain it without much verbal description. It consists of a box, C, in which the watch, F, is hung in such a manner as to receive the rays of a reflecting electric lamp, D, upon its dial. The current is led to the case by wires and terminals, A, B, and a magnifying-glass, E, is fixed in the door of the case to allow the time to be read off in the dark.

Platinoid.

Platinoid is a new alloy which, when polished, resembles silver, and has electrical properties which fit it to replace German silver for the manufacture of artificial resistances. It may be described as German silver with from one to two per cent. of the metal tungsten added. The tungsten is added in the form of phosphide of tungsten, and fused with some copper. Nickel is then added, and zinc; and then more copper; the whole being fused and fused again until the phosphorus and part of the tungsten are given off as scorix, leaving the alloy "platinoid." It is remarkably free from tarnishing in the atmosphere; is very strong; and has an electrical resistance about $1\frac{1}{2}$ times greater than German silver. Like German silver it varies comparatively little in electric resistance under change of temperature. It is even superior to German silver in this respect, and to platinum-silver or other alloys tested by Mathiessen for electrical purposes.

Projecting Life-Lines as Fire-Escapes.

The New York Fire Department recently tried a number of guns and appliances for throwing life-lines into the windows and over the roofs of high buildings. The experiments were made on the Palisades of the Hudson. Lines varying in length from 200 to 700 ft. were successfully cast over these cliffs, some by the aid of gunpowder, others by compressed air.

A Dry Battery.

According to recent researches of Dr. Onimus, voltaic batteries containing ammonium chloride and zinc chloride can be converted into dry piles by mixing these solutions with plaster of Paris, and allowing the mixture to solidify. If mixtures of ferric oxide and manganese peroxide with plaster of Paris are employed, the electromotive force is slightly higher than

with plaster of Paris alone, and when oxide of iron is used the battery quickly regains its original strength on breaking the circuit. When the battery is exhausted, the solid plaster of Paris has simply to be moistened again with the solution.

Condensing Lead Fumes by Electricity.

Recent experiments of Dr. O. J. Lodge have shown that the discharge from an electrical machine into the air is able to deposit dust by causing the particles to agglomerate and sink to the ground, or collect on the walls of a room. This discovery has been applied by Mr. A. O. Walker to the condensation of lead fumes in lead-smelting. Experiments made at some lead works at Bagillt, North Wales, proved successful, and preparations have been made for gradually adopting the plan, which is a great saving of time as compared with the usual method of allowing the fumes to slowly deposit in long galleries. Mr. Wimshurst's influence machines, with plates five feet in diameter, are to supply the electricity. They will be driven by a small engine, and a series of metal points will discharge the electricity into the flue conveying the lead vapours.

A Self-Opening Gate.

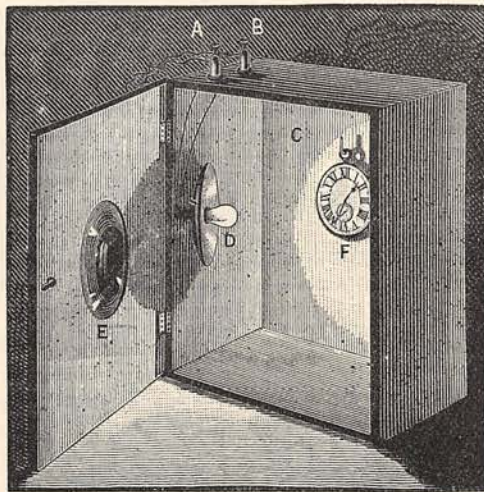
A device for opening a gate by means of treadles, which can be operated by driving one wheel of a vehicle over them when placed in the roadway, has been recently patented. The treadle when depressed operates a bar and lever and throws the gate out of the vertical plane, so that it swings open of itself, as it were, and remains open until the vehicle passes over a second treadle, when it closes of itself. Factory or other doors may be worked in the same way.

Mercury as Ballast.

Nelson is said to have employed casks of water as ballast in order to improve the speed of a vessel by the impact of the water swaying. Hence several members of the New York Yacht Club propose to employ flasks of mercury this summer as ballast. No doubt the superior weight of mercury fits it for a convenient ballast; but whether its liquid property will add to the speed of the craft is quite another matter.

Asphalted Tiles.

A method of treating tiles with asphalt, and thereby fitting them for roadway-paving purposes, has been introduced at Charleston, United States.



The bricks and tiles are first heated in an oven under sand, and when taken out are plunged into melted asphaltum, then placed on racks, so that the excess of asphaltum can flow away. In stopping the pores of the bricks, their decay from moisture will no doubt be retarded by the asphaltum.

A Portable Bird-Cage.

A new bird-cage has been designed for travelling purposes, which obviates the use of a handkerchief over the cage. It will be useful for exhibiting birds at shows. The front is covered by a hinged shutter of metal, which slides in grooves over the front, and folds up when not required into a space on the top of the cage, which is made double on purpose. On the arrival of the cage at its destination the shutters are withdrawn, folded up, and inserted in the space between the double ceiling. Air-holes are provided in this shutter for ventilation.

Wire Laths.

The use of wire netting of about half-inch mesh is found to be a preventive of fires in buildings. The mortar is said to guard the wire from rust; but plaster of Paris rots it owing to the action of the lime sulphate on the metal.

A Gas-Lit Buoy.

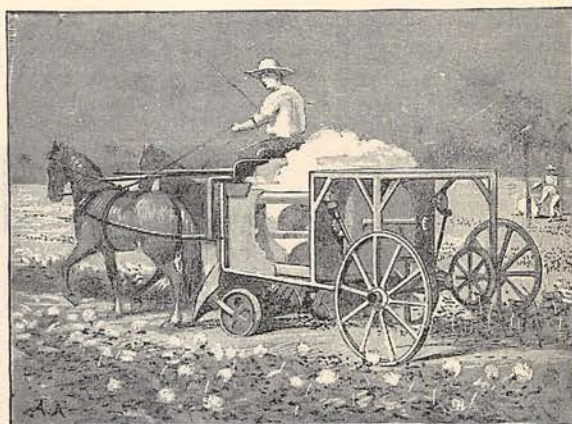
Pintsch's gas-lighted buoy is better known in our country than that of Mr. J. M. Foster, which we illustrate. It is an American invention, and consists of a group of welded cylinders strong enough to withstand heavy blows. Each cylinder is a water-tight compartment, and has an independent valve to prevent the escape of gas should any of the other cylinders be injured. The gas employed is made from petroleum, and compressed to forty or fifty atmospheres of pressure. A regulating valve reduces the pressure to that suitable for lighting purposes. The buoy has been tried by the United States Lighthouse Board in Carrituck Sound, North Carolina, and found to give a much better light than the oil buoy, while the cost is slightly less than that of oil. A portion of the mooring-chain is shown in the figure. The light, as will be seen, stands well out of the water.



A Body Lightning-Rod.

Mr. Delane, inventor of the Synchronous Telegraph, has devised a lightning-rod for wearing on the person. This idea is not very novel, but it has a fresh interest in connection with the accidents to electric light men from accidental shocks, especially, as in America, where the dangerous naked wires are sometimes used. The rod, as may be imagined, consists of

copper cords which branch along the arms and legs, where they are connected to metal plates on the soles of the boots, and thus reach the earth. In the event of both feet being off the ground at once, a short length of metal chain or braid might be allowed to drag on the ground. We are not aware that any one has practically tested this device in a lightning-storm; but experiments could be made with it on electric light currents, for which Mr. Delane wishes it to be a safe-guard.



An Automatic Cotton-Picker.

Cotton-picking is now chiefly done by hand, but an American inventor has brought out the mechanical picker which we illustrate. It is mounted on wheels so as to bestride a cotton row, and the machine is double so as to glean each side of the row. The cotton is caught by numerous teeth, which are afterwards cleared of it by means of rapidly revolving brushes. The cotton is then sent into a receptacle, where it remains until taken out by hand. The picker plates set with teeth traverse the whole of the cotton plant where there is likely to be any cotton, and strip off the wool while letting the branches and leaves pass through. The machine weighs 800 lbs., and is estimated to pick four bales per day, or, in other words, to do the work of sixty hands.

THE READING CLUB COMPETITIONS.

The Editor regrets to say that of the Abstracts and sets of Programmes for Variety Readings submitted, the Adjudicator reports that not one so far fulfils the conditions of competition as to be eligible for the Prize. Under the circumstances, the Editor is reluctantly compelled to withhold the Prize altogether.

SHORT STORY COMPETITION.

Intending Competitors are reminded that the latest date for receiving MSS. for this competition is September 1st, 1885.