

THE GATHERER.

Electric Light Signs.

A patent was recently taken out in America for a mode of forming the incandescent filaments of electric lamps into letters, signs, and symbols. When heated up by the passage of the current these figures will, of course, be brightly visible in the dark. While upon this subject we may add that globes of spun glass are now used for electric lamps, because they absorb less light than solid glass ones. "Electrine" is a new kind of glass specially made for these lamps. It resembles opal glass, but is not so dense, and absorbs less light.

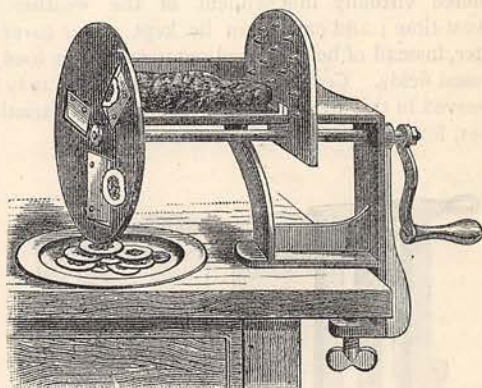
Window-Blind Holder.

In summer time when the days are hot and it is desirable to have the windows open, discomfort or worry is occasionally caused by the flapping of the blind to and fro. The object of the useful and unpretending invention represented in the accompanying wood-cut is to prevent this irritating movement, while at the same time allowing of the window being kept open. As will be noticed, the simple appliance comprises a couple of pieces of chain of proper length, fastened to the lower end of the blind near opposite edges, and two hooks secured to the window-sill by one or two links and capable of "engaging" with the chains on the blind. Two hooks are attached to the blind-rod for receiving the ends of the chain when not in use. The chains when looped up are considered to present rather an ornamental appearance than otherwise, and it has been suggested that they might very suitably become substitutes for tassels. As the hook may be "engaged" with any link of the chain, it is clear that the blind may be adjusted to any desired height.

Feline Sanitary Inspectors.

An ingenious householder in the United States has invented a new test for defects in waste-pipes and drain-pipes, which seems likely to prove successful. It often happens that while offensive odours lead the occupiers of a house to suspect a leakage in one of the pipes, the plumber is unable to track the escape of foul gas to its source. In such a case purchase some oil of valerian, and pour it down the pipes at the opening nearest the top of the house; then station a cat on each floor. It is well known that cats have a keen sense of smell, and at the same time are extremely

fond of the odour of valerian; it will not be long, therefore, before one or other of the feline occupants of the house will trace the escaping valerian to its source, and will show by its attitude and purr of satisfaction that it has done so. At the spot so marked let the pipe be exposed to view—the covering of woodwork or plaster being removed—and it is almost certain the defect will be discovered. At any rate, this was the result of the first experiment of the sort.



A Vegetable-Slicer.

The machine which we illustrate herewith explains its own action. It is shown slicing a cucumber, the slices being in the act of falling into a plate. On rotating the handle the tuber is pushed forward to the disc, which slices it as it revolves. The device can be fitted to any table by a clamp and screw. It will cut down in this way such vegetables as carrots, beet, lettuce, apples, potatoes, and so on—an accomplishment which eminently fits it for the use of the cook and salad-maker.

What is Ensilage?

This has been concisely defined as the process by which crops are stored in air-tight and water-tight pits, and pressed down by weights. Like so many other things, it was discovered in ancient times, forgotten, and long afterwards re-discovered. It was well known to the Romans, and was found in general use among some of the aboriginal races of America by their European conquerors. It had its origin in the desire to secure agrarian produce from marauding invaders; but when it was seen that grain, &c., could be preserved for long periods by this means, it was elevated into one of the regular processes of agriculture. Its revival in our own times is due to a French gentleman, M. Spoffart, who cultivates his own estate at Sologne, near Orleans. Observing the loss of valuable nutritive elements which takes place when green fodder is converted into hay, even in the most favourable weather—a loss of which every farmer is

conscious, though it may elude the closest analysis—he made experiments to ascertain whether or not forage could be kept without having previously been desiccated. He accordingly stored his grass in “silos,” as the pits are called, and the result was entirely satisfactory. Similar experiments have since been made in the United States, and with so much success that the process has come into extensive use among American agriculturists. The ensilaged food, although it has an acid smell, is eagerly devoured by cattle, and they are said to thrive upon it hardly less than upon growing grass. Ensilage, it may be added, has many advantages. The cost is only about one-third of that incurred in making and storing hay; the farmer is rendered virtually independent of the weather in harvest-time; and cattle can be kept under cover in winter, instead of being turned out to seek their food in exposed fields. Crops of almost every kind may be preserved in this way, including grain of all varieties, clover, leguminous plants, and even apples.

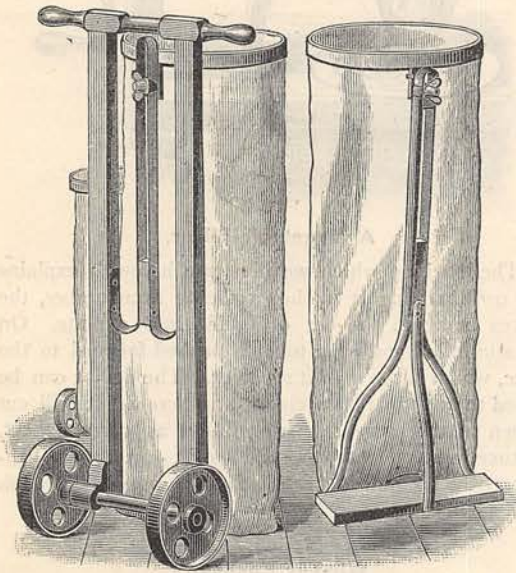
used in connection with a truck, and also with an ordinary support, which might be placed in a shop-corner without occupying much space.

A Model Eye.

An ingenious model eye for demonstrating the action of that member has been devised by Professor Kühne. It consists of a long rectangular trough filled with water. The front end is provided with lenses and diaphragms of proper shape and colour to represent the cornea and crystalline lens. Hollow glass lenses are provided to receive the fluids serving as aqueous and vitreous humours, and a movable ground-glass screen takes the place of the retina. With the help of movable lenses of various shapes, which stand in the trough, all the peculiarities and defects of vision can be illustrated. Perfect or defective vision is recognised by a clearness or a blurring of the real images of external objects formed on the ground-glass plate.

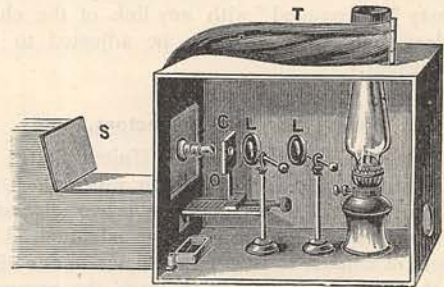
The Photo-Micrograph.

The device we illustrate is a plan for taking photographs of microscopic objects without the use of a camera or a microscope. The apparatus consists of a lidless box placed on its side. At the left end it has a square hole cut in the wall, but any aperture will do. A brass plate having an adaptor in it slides in or out on runners, for more easily changing the powers when it is desired to do so. Another long aperture is made at the top side, and it is fitted with a blackened chimney to carry off the heat from a “duplex” paraffin lamp placed inside. Another aperture at the bottom of the right side serves to admit the air to the lamp when the front of the box is covered by the black focussing cloth. Within the box, and attached to the left side, is a carrier, *C*, for holding the object to be photographed. It moves on a long fine screw, and adjusts the object to the proper focus. Two condensing lenses, *L, L*, one to render the rays of the lamp parallel, the other to condense them on the object, complete the arrangement within the box. The light passing through the objective lens, *O*, issues from the box in a conical beam, and on the principle of the



An Ingenious Sack-Holder.

The accompanying woodcut represents a device for holding sacks while they are being filled, of which the chief and most obvious advantage is that it dispenses with the assistance of a second person in the filling process—surely a useful feature enough. As will be seen from the engraving, the sack is attached to a hoop of a round or oval shape, from which it hangs until it has been filled. The holder may be fastened at any height upon its stand by simply adjusting the screw which runs up and down the support. The frame-work being made entirely of wrought-iron is not only inexpensive, but light, and can readily be applied to a truck or platform scale, or to a stationary stand. There can be little doubt that such an appliance would be found of considerable service to many tradesmen. The diagram shows the holder as



magic lantern projects the image on a screen, *S*, seen to the left of the box. This screen may be a plate of glass, or note-paper, and the image is to be sharply defined by adjusting the carrier, *C*, behind the focussing cloth, *T*, which is brought down in front of

the box. The screen may now be removed, and its place taken by a dry gelatine plate, and the exposure accurately timed according to the nature of the object. The only outside light must be a non-actinic red light, for the only white or actinic light falling on the plate must be that of the image, otherwise the photograph will be "fogged," or misty. The developer employed by Mr. White is made by adding one part of saturated solution of protosulphate of iron to three parts of saturated solution of neutral oxalate of potash. The resulting ferrous oxalate develops best when freshly mixed.

A New Voltaic Battery.

Voltaic batteries, after being neglected for electric lighting purposes in favour of dynamo-electric generators, are now seen to possess considerable advantages for lighting isolated buildings. The Duplex Electric Light Power and Storage Company have been among the first to recognise their value for such a purpose, and have introduced a novel battery of great power and constancy. This is the "H E" battery, so named after its joint inventors, Mr. George Holmes and Dr. S. H. Emmers. One objection to batteries for in-door lighting is the noxious fumes given off by the Bunsen and Grove types, that is to say, the types hitherto found best for the electric light; but in the H E battery this fuming is practically suppressed. It also yields by-products during action which may be utilised, and the expense of maintaining the battery recovered. Single and double cells will be found very useful by persons employing the incandescence lamp for microscopes or other minor purposes; and batteries on a larger scale can be employed by farmers or country gentlemen to light their premises, or by shopkeepers in towns who object to the introduction of steam or gas engines and dynamos, with their accompaniments of high insurance, noise, dirt, and smoke.

Photo-Filigrane.

Paper is now "water-marked" with photographic designs and portraits by a process brought out by Mr. Woodbury. The photograph to be treated is engraved on iron rollers by existing methods, and the paper is compressed in passing through them, so that when it is held up to the light the design is visible in light and shade. The effects are pretty and novel; visiting cards are impressed with a portrait of the owner, and letter-paper stamped with a view of the place it comes from. The process is also likely to be of use in manufacturing bank cheques, coupons, and bills of exchange.

Electrotyping Telegraph Wires.

Iron telegraph wires are now covered with a coating of copper by galvanoplasty. The object of the coating is to protect the iron from rusting in the air, and at the same time increase the conducting power of the wire

for the electric current. Wires of phosphor-bronze are also beginning to be employed in overland telegraphs, instead of the iron wires universally employed until now. They are lighter, stronger, and do not rust in air; moreover, by a new treatment, they can be rendered quite as conductive as iron.

A Fossil Mine.

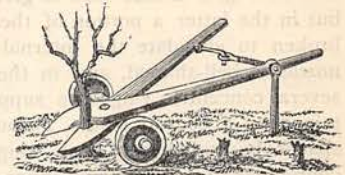
The sandstone quarry at Turner's Falls, on the Connecticut River, in Massachusetts, is a veritable mine of fossils. It was originally brought into fame through the bird-tracks imprinted in its stone. The slabs of dark sandstone with the bird-tracks on them now fetch high prices, some of them being valued at 500 and 1,000 dollars. One slab recently excavated has tracks on it of an enormous bird, which must have been some twenty-five or thirty feet high. The tracks are five feet apart, and measure fifteen inches in length. The delicate tracery of insect-feet, rain-pits, and wave-ripples also invests the slabs with a geological as well as ornamental interest. The whole region is believed to have once been covered by the sea, and the marks remaining on the stone are literal "foot-prints on the sands of time."

A Vast Coal-Vein.

Probably the largest coal-vein in the world has recently been discovered in the Ute Indian Reservation, Colorado. It extends over 1,600 acres of land, and the coal is of a jet-black, semi-bituminous nature, almost wholly free from sulphur. It will smelt iron without coking, and is used at present by the miners to dress their steel drills in lieu of charcoal. Three railroads are now being run to the mineral field so as to tap the supplies.

New Ground Shears.

In the annexed woodcut will be seen a representation of an improved pair of "grubbing" shears, which will be found useful in certain gardening processes which are generally disliked very much, owing to their involving a great deal of stooping. The appliance is specially designed for clearing land of under-growth, weeds, briars, &c., and ought to supersede work usually considered to be of a decidedly laborious character. This invention consists of a heavy pair of shears mounted on a strong, low-set truck. The shears are so formed that they may be employed either for cutting purposes simply or for uprooting, the handles serving as the levers in the latter case.



In order to enable heavy brush or stalks that are too strong to be tackled by hand-power alone to be dealt with, the handles are provided with a screw and lever which can easily be brought into action for drawing the handles forcibly together, for the purpose of this special kind of cutting.

Bean Cheese.

A peculiar bean, from which the Chinese make a species of cheese, has been introduced into South France for acclimatisation. The cheese has a very delicate taste, something like Parmesan, and it resembles an animal product in containing much fatty matter and albumen. The fresh bean is also a palatable vegetable, and the husk serves as good fodder for cows and horses.

A New Anti-scorbutic.

Mr. Robert Galloway, of Dublin, has ascertained that phosphate of potash will restore to salt meat the anti-scorbutic properties which the brine extracts. If the phosphate is therefore added to the soup or gravy made from the salt joints, the danger of scurvy will, he claims, disappear. It is said also to make the salt meat taste more like fresh beef, and hence it will improve the taste of sea-fare.

Novel Nozzle for Fire-Hose.

It is said, on good authority, that the utility of water in extinguishing fires depends, to a greater degree than is commonly supposed, upon the manner in which it is cast on the burning building or other object. When thrown in a solid stream, so to speak, it is much less effective than when "sprayed" and spread out: obviously by the latter method a wider area is covered. The accompanying engraving represents a nozzle constructed

in accordance with the requirement mentioned. Fig. A shows a hose with this nozzle in use; in Fig. B a front and in Fig. C a side view is given of the appliance, but in the latter a portion of the apparatus has been broken to elucidate the internal construction. The nozzle is bell-shaped, and in the mouth of the bell several concentric rings are supported by arms sustained on a central stud. Through the thin annular spaces lying between each ring and the surfaces contiguous to the outer and inner rings, water is propelled in conical sheets, which break up into spray and thus play upon a considerable extent of surface.

Pattern-Printing by Electricity.

M. Goppelroeder, whose aniline dyes prepared by the electric current attracted notice at the recent

Paris Electrical Exhibition, has gone a step further, and now prints patterns in aniline colours within the tissues of cloth or paper, by means of the electric decomposition of aniline salts. Thus an aqueous solution of chlorhydrate, an aniline salt, yielding a black dye when the electric current is passed through it, is taken, and the tissue to be printed is steeped in it between two metal plates, one of which has the pattern cut in relief upon it. This plate is connected to one pole of the battery, and the other plate is connected to the other pole. The current, passing from one plate to the other through the wetted cloth, decomposes the solution along the projecting lines of the metal pattern-plate, and reproduces the design. Colours may also be effaced or blanched in the same way, and colourless patterns may be picked out on coloured cloths.

A Moving Hill.

The Poet Laureate has told us that the "hills are shadows and they flow, From form to form, and nothing stands;" and his words have a very practical illustration in a rambling dune of sand situated in the eastern part of Churchill County, Nevada, U.S. The hill is about four miles long by one wide, and from 100 to 400 feet high. It comprises millions of tons of sand, each particle no bigger than a pin's head, and so soft and clean withal, that it will find its way out of a sack if jolted. The mountain, we are told, is so dense that the sand gives a musical sound under the foot-fall, and often a bird lighting on it, or a lizard running along the slopes, dislodges a train of sand which slides downward with a hum resembling the vibration of a telegraph wire. The whole hill is slowly travelling from west to east under the shifting action of the wind blowing over it. From the time it was first discovered, several years ago, until now, it appears to have moved about a mile.

A Simple Tellurian.

The woodcut illustrates a simple apparatus for showing the cause of day and night, the year and seasons, to a class of pupils. It is designed by Mr. Jeremiah Spicer, of Taylor's Island, Md., United States, and consists, as will be seen, of a stand carrying a lamp to represent the sun, and a movable arm to represent the earth. The arm can be swung round into the opposite position or any intermediate one, so as to cause winter or summer, and the earth can rotate on its axis to produce day and night.



A Chemical Fire-Engine.

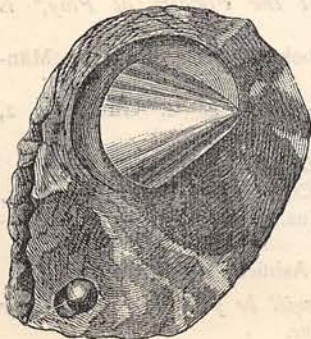
A new fire-engine discharging water mixed with carbonic acid gas, which has powerful extinguishing properties, was recently tried in London. It is the invention of Mr. Foster, and it extinguished a fire in a wooden building fed with tar and paraffin in a few minutes. A man of wood and shavings saturated with paraffin was lighted, and the blaze succumbed in a surprisingly short time to the gaseous water. It is stated by the inventor that 350 gallons of chemicalised water at a pressure of 99 pounds thrown by a one-inch jet or hose is equivalent in its fire-quelling power to 9,000 gallons of ordinary water.

An Electric Amalgamator.

In extracting gold from its ore by amalgamation of the metal with mercury, the mercury gets sluggish in its action owing to a surfeit of copper, iron pyrites, and other impurities. The metal becomes "sickened," as it is termed, and this fact has prevented many valuable deposits of gold ore from being profitably worked. Mr. Richard Barker, F.G.S., finds, however, that when a current of electricity is sent through the mercury it recovers its vigour, and does not again succumb to "sickening" so long as the current is kept flowing. The invention has been taken up by a company, and a public exhibition of the process was recently held at their works near London Bridge. The apparatus consisted of an inclined table about twenty feet long, and varying from three feet to six feet wide. In this table at intervals were placed the "riffles" or baths containing mercury, and over these baths the pulverised gold ore flowed in a constant stream of water. The negative pole from an electric generator was connected to the mercury, and the positive pole was introduced into the water. The current causes a continual agitation at the surface of the mercury, and thus prevents the "sickening," and the ore is kept in movement. It was also shown that batches of mercury sickened with oil, arsenical ores, antimony, and iron pyrites rapidly recovered their pristine vigour.

Curious Effect of Lightning.

At the summit of the Puy de Dôme mountain in France there is an observatory, and on the observatory is fixed a Robinson anemometer, with copper cups which revolve with the wind. Quite recently these metal cups were observed to be carved into curious little pits and nipples, such as the figure illustrates. The effect was produced by a lightning discharge of the gentler sort known as St. Elmo's fire, and the conical form of the projection would seem to indicate a whirling motion of the electric flow.

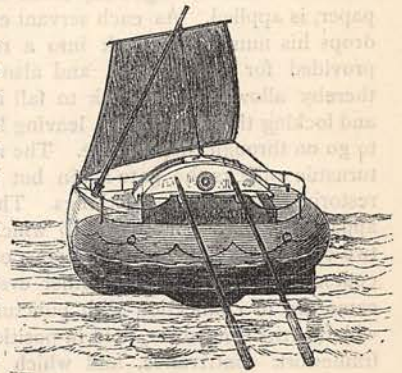


A New Method of Enamelling Water-Pipes.

A remarkable discovery in the art of enamelling has just been made by two inventors in Bohemia. The enamel—the composition of which is at present a secret—is applied direct to the pipes during the process of casting, by covering the sand cores with the composition, and then when the molten iron is poured in as usual, the intense heat fuses the enamel, which at once attaches itself freely to the iron, and detaches itself so completely from the sand that the enamelling is said to be all that can be desired for water-pipes and other industrial purposes. The colour of the new enamel is grey.

A Buoy Life-Boat.

The life-boat which we illustrate consists of a large life-buoy of circular form, with an inner chamber of steel plates having a flat bottom. Below the bottom of the boat is a hollow girder keel, open at the top into the vessel, and two bilge clogs, one at each side of the keel, tend to support it when upon the deck of the ship. A flat-sided dome-shaped erection in the centre gives access to the hold below. The craft is rendered buoyant with air-tanks, and the upper deck is fitted with rowing oars. The advantages claimed for the life-boat are its safety and ease of launching.



A Centrifugal Soot-Collector.

An ingenious appliance for preventing the escape of soot into the atmosphere has been devised by Herr Albert Petzold, a Berlin engineer. It consists of two hollow cylinders, made of sheet-iron, arranged one below the other, but with a space between them rather wider than the diameter of the cylinders. They are placed either in the chimney, or in a chamber above the grate communicating with the chimney. The upper cylinder rests on a plate closing the chamber, except within the cylinder, so that the air around the cylinder is at rest. A band of sheet-brass runs spirally round the two cylinders, giving the smoke a rotary motion, and causing the particles of soot and ash, by centrifugal force, to pass out by the space between the two cylinders, and fall into the chamber outside the lower cylinder, to be removed at intervals by means of a small door.

Making Luminous Paint.

Oyster-shells, cleaned in warm water, and baked in a fire for thirty minutes, are allowed to cool, then pounded fine, and the grey parts removed. The powder is put into a crucible with alternate layers

of flour or sulphur, the lid is put on and cemented with sand made into a stiff paste with beer. When this "luting" is dry the crucible is put into a fire and roasted for an hour, then taken out to cool. The lid is taken off when the crucible is cold, and the white powder obtained is self-luminous. All grey portions are to be discarded. It should be sifted through a muslin strainer, and mixed with gum and water into a thin paint, which when applied in two layers to an object renders it luminous after dark, provided it be exposed to day-light previously.

A Servants' Time Recorder.

The automatic registration of the time a workman or other person enters and leaves a factory is effected by the "workman's time recorder." The apparatus consists of a gate and turnstile to which a tell-tale, in connection with an eight-day clock and roll of ruled paper, is applied. As each servant enters the gate he drops his numbered check into a recess in a table provided for the purpose, and also pushes a lever, thereby allowing the check to fall into a receptacle and locking the gate behind, leaving him no option but to go on through the turnstile. The movement of the turnstile unlocks the gate again but locks itself, thus restoring the first state of things. The self-registering apparatus consists of a clock to which are connected two cams with horizontal motions, one traversing its course in twelve hours, the other every hour. These cams are in connection with puncturing pins, facing which is the time-sheet, held in position by a suitable framework contrivance, and which is automatically moved onwards through rollers, and forwards to the puncturing pins, by the action of the turnstile as every operative passes through. When all hands have arrived the dominoes or checks are found to tally with the record on the time-sheet.

Answers to Literary Queries on page 237.

1. Thackeray.
2. From a palace which stood there for the reception of the Scotch King, when he came to pay his homage to the King of England.
3. Luna in Heaven, Diana on Earth, and Proserpine in Hell.
4. James Hogg, the Scotch poet.
5. The great ash-tree, or tree of life that binds together Heaven, Earth, and Hell. (Scandinavian mythology.)
6. "To match the men." (See "Adam Bede.")
7. Anne Clifford, wife of the Earl of Dorset.
8. "Peccavi"—i.e., "I have sinned" (Scinde).
9. Dr. Johnson's.
10. 150.

Thought-Reading and Will-Power as an Amusement.

To the Editor of CASSELL'S FAMILY MAGAZINE.

SIR,—About the time the last Part of this Magazine was published, I, together with some friends, had been much interested in the subject of "willing," but had not heard of "thought-reading," and I must confess

that the former is much more interesting than the latter. It may be worthy of note that, about the time your article appeared, two sermons were preached in this neighbourhood, in two different churches by two different clergymen, on this subject.

Some of our experiments were very remarkable, and may be of interest to many readers.

After the patient to be operated on had been sent out of the room, it was arranged that he was to be "willed" to open the door of the conservatory. He was then called back, and two persons having placed their hands lightly round his neck, he, after some slight hesitation, went to the opposite end of the room, staying there for a few moments, and then with considerable reluctance turned round, walked to the conservatory, moved a chair out of the way, and opened the door: this all being accomplished without being blindfolded or the eyes closed.

Another remarkable instance was when a young lady was willed to fetch the mat from the hall-door, and place it on a couch in the dining-room, which she did without the slightest hesitation. The same person was on another occasion willed (with her eyes blindfolded) to find a small card-table and turn it upside-down, and then roll up the hearth-rug. She turned the table top-side-turvy, but would not roll up the hearth-rug, although going down on her knees before it.

Further trials were made, among them being the following. While blindfolded the subject was willed to remove a basket from a table in one corner of the room to a chair in another, then take the scoop from the coal-scuttle and place it on a particular chair, both of these tests being most successfully accomplished.

Out of nine persons who have been *willed*, only two have failed to carry out what was desired; but in regard to *thought-reading*, only two experiments have been successful, both "readings" being by one who cannot be "willed" to do anything. It is certainly a very interesting amusement.—I am, Sir, &c.,

R. S. H.

Song Competition.

The Editor has great pleasure in publishing the award of the Adjudicators to whom the 85 MSS. entered for this Competition were submitted. After a careful consideration of all the settings, the PRIZE of FIVE POUNDS offered by the Proprietors of CASSELL'S MAGAZINE for the best setting of Mrs. Hemans' words, "Child amidst the Flowers at Play," is awarded to

J. J. ROBERTS, Brookfield, Glossop, near Manchester.

Proxime Accessit—ELEANOR C. GREGORY, 2, Amen Court, St. Paul's, E.C.

Honourable Mention also awarded to

(3) ALICE HELENA COX, 2, Wales Road, Tavistock.

(4) W. CLAXTON, Mus.B. Oxon, St. Michael's College, Tenbury.

(5) C. W. THOMAS, Ashfield, Wrexham.

The Prize Setting will be published in an early Number of the Magazine.