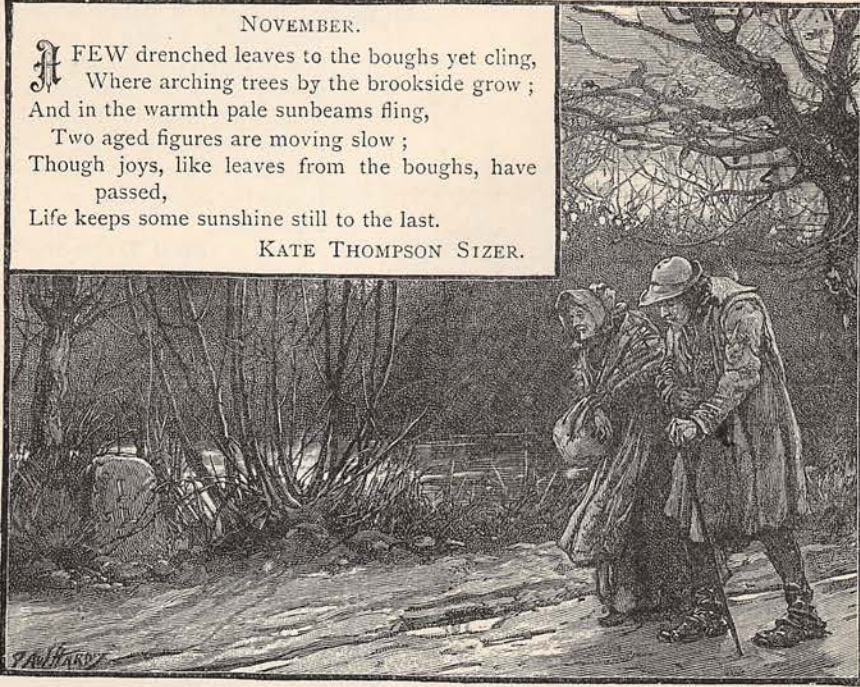


PICTURES OF THE MONTHS.

NOVEMBER.

A FEW drenched leaves to the boughs yet cling,
 Where arching trees by the brookside grow ;
 And in the warmth pale sunbeams fling,
 Two aged figures are moving slow ;
 Though joys, like leaves from the boughs, have
 passed,
 Life keeps some sunshine still to the last.

KATE THOMPSON SIZER.

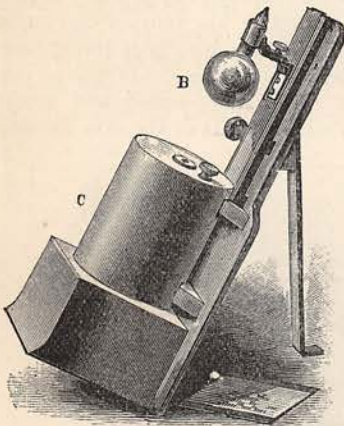


THE GATHERER:

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

Correspondents are requested, when applying to the Editor for the names and addresses of the persons from whom further particulars respecting the articles in the GATHERER may be obtained, to forward a stamped and addressed envelope for reply, and in the case of inventors submitting specimens for notice, to prepay the carriage. The Editor cannot in any case guarantee absolute certainty of information, nor can he pledge himself to notice every article or work submitted.

McLeod's Sunshine Recorder.



reflected from a silvered glass ball B. The ball is mounted on a slide provided with a rack and pinion

The ingenious sunshine recorder of Prof. McLeod, of the Indian Engineering College, Cooper's Hill, is shown in our engraving. It is photographic, and consists of a small cylindrical camera, C, of metal, containing the sensitive paper which is marked by the sunshine as re-

so as to focus the reflected image of the sun on the sensitised paper. The instrument should be placed with its vertical plane in the meridian and inclined with the ball upwards, so that the axis of the camera makes an angle with the horizontal, equal to the latitude of the place at which it is planted.

The Aerophor.

Electricity is developed by the machinery of spinning and weaving mills, and it has the effect of touting the fibre, so that a damp atmosphere is required in such places to allow the electricity to leak away. This is commonly secured by damping the floors, but the plan is unhealthy and injurious to the machines. A German engineer has therefore introduced the "aerophor," which diffuses a fine cloud of spray, either hot or cold, by means of a high-pressure pump. It consists essentially of two nozzles at right angles; and a jet of water at high pressure being projected through one is diffused by a jet of air issuing from the other. The apparatus is fixed on the ceiling,

and as the particles of moisture are small and the atmosphere not superheated, the method is clean and wholesome. It was recently tried at some mills in Ashton-under-Lyne, where 468 looms were served by 11 aerophors with every success.

Automatic Fog-Signals.

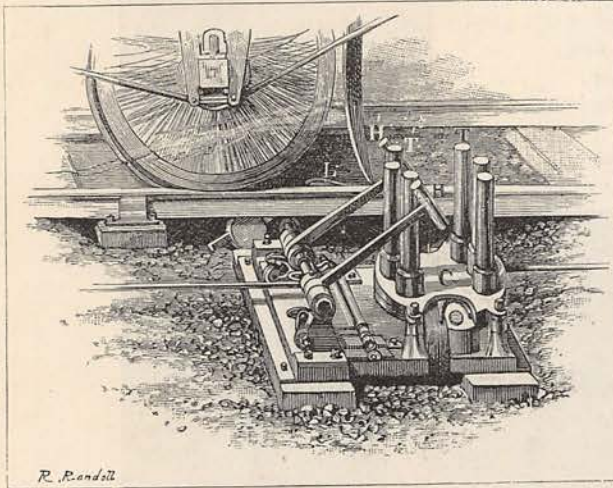


FIG. 1.

The ordinary fog-signals on railways are a source of danger to life and limb, requiring as they do the presence of men on the lines. The automatic apparatus shown in the figure is intended to obviate this drawback. The explosive cartridges are contained in two sets of three turrets *T T'*, which communicate below with a cylinder *C*. Two hammers *H H'* are worked by levers actuated by the wheels of the train. When the connecting rod, shown on the left, is pulled from the signal-box, two cartridges drop into the chamber and are placed in position under each of the hammers. The elbow-levers or triggers *L L'* (see Fig. 2) actuating the hammers, are at the same time set between the rails, one in advance of the other. When the train passes, these levers are depressed by the wheels, and the hammers explode the cartridges one after another. When only one explosion is desired, the apparatus is made single instead of double.

A Luminous Beetle.

A recent number of the Journal of the Royal Agricultural and Commercial Society of British Guiana contains an interesting paper on the luminous larvæ and beetles of that colony. Among these is a beetle evidently belonging to the *Elaterride*, or spring beetles, which is strikingly beautiful when seen in a dark place. The light is emitted along the whole body of the animal, from its head to its posterior segment, which are entirely luminous, while the intermediate segments are adorned with separate rows of golden brilliants. The light is singularly bright and quite steady, except that one or more of the dorsal jets seem to wax and wane at intervals without going out. When the insect is irritated the light becomes more intense.

Boiling Lakes.

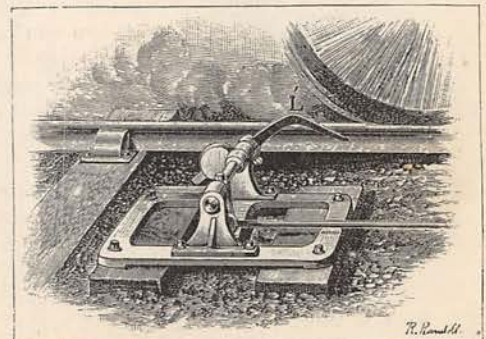
At the eastern base of a mountain range, east of the Sink on the Carson River, Nevada, there is, according to an American contemporary, a small lake covering about two acres, and enclosed between red cliffs 200 to 300 feet high, which is constantly steaming, and occasionally boiling in parts from the overflow of geysers or boiling springs. A brook flowing out of the lake sends up a cloud of steam for a distance of several yards. About a mile from the pond a large deposit of sulphur and alum has been discovered. There is another *boiling* lake near Lanssen's Peak, California.

Steel Trellis-Work.

A machine for stamping out and twisting trellises from a steel plate, as one cuts a diamond network from a sheet of note-paper, has been invented by Mr. J. T. Golding, of Chicago, and has lately been introduced into this country. The machine not only cuts the plate, but forms the trellis, which is afterwards painted or galvanised if desired. Trellises of diamond mesh are suitable for fencing, or as a substitute for wooden laths in plastering a wall. These trellises are made in sheets of different sizes, not in a continuous roll like wire fencing.

The "Hedgehog" Transformer.

Transformers are largely used for turning electric currents of high tension into others of low tension suitable for electric incandescent lamps. A high tension current can be transmitted to a greater distance over a smaller wire than a low tension current with the same loss of power, and hence there is a saving in copper by distributing the electricity at high tension, and then transforming it into low tension current for the service of the lamps. These transformers are, as is well known, a modification of the "induction coil," and consist of a primary and secondary circuit. The high tension current is passed through the primary circuit, and induces a corresponding low tension current in the secondary circuit. In this process of transformation by induction there is a certain loss of power, due to the resistance of the primary circuit, and to the "hysteresis" or molecular inertia of the iron forming



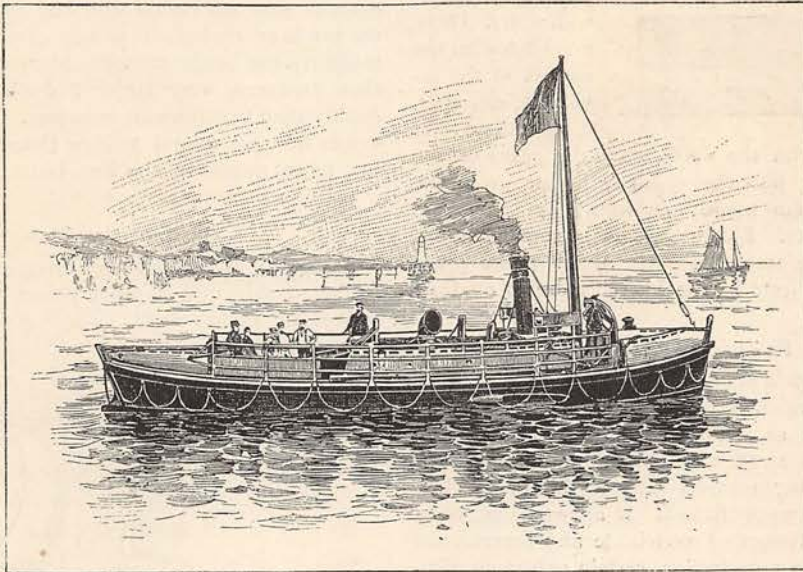
AUTOMATIC FOG-SIGNAL.—FIG. 2.

part of the apparatus. In the "hedgehog" transformer of Mr. Swinburne the iron is broken up into a bristly form, with the result that the loss of power by hysteresis is much reduced. Such a transformer has an electrical efficiency of about 87 per cent. during a day's work—that is to say, the loss of power in the apparatus is only 13 per cent.

Bacteria and Plants.

The action of the liquid secreted by so-called "carnivorous plants" on the insects and other crea-

tall men once existed on the earth and have become extinct. A contribution to the subject has recently been made by M. de Laponge, a French archæologist, who has discovered portions of the skeletons of two veritable giants in the prehistoric cemetery of Castlenau, near Montpellier. One of these was a skull which must have belonged to a youth about seven feet high and some eighteen years of age. The type of skull was that found in the dolmens, or stone sepulchres of Lozère. In an earthen tumulus, containing cists belonging to the Bronze Age, M. de Laponge also



A NEW STEAM LIFEBOAT.

tures caught in it has been considered a process similar to that of digestion. But, according to the observations of M. Raphael Dubois on seven species of nepenthes in the Botanical Garden of Lyons, it is due to bacteria in the fluid. If the secretion is drawn from the receptacle before the latter opens it is pure, and albumen is not affected by it; but, on the contrary, if drawn from the opened receptacle it exerts a powerful action on the albumen, and is, moreover, found to swarm with micro-organisms.

A New Steam Lifeboat.

Our illustration shows the new steam lifeboat constructed at Blackwall for the National Lifeboat Institution. The engines provided 200 horse-power during a recent trial with a consumption of 2 cwt. of coal per hour. She carries enough fuel to last thirty hours. Special attention has been paid to her turning and stopping powers. She can be brought to a dead stop from full speed in 32 seconds, and at full speed can make a complete turn in 50 seconds.

A Fossil Giant.

Giants figure so largely in our oldest traditions that it is a serious inquiry whether or not a race of very

found parts of three human bones, the tibia, femur, and humerus, which must have come from a man no less than eleven feet high. This giant must have lived about the beginning of the present geological period, and, strange to say, an old tradition places the cavern of a giant in this valley of Castlenau.

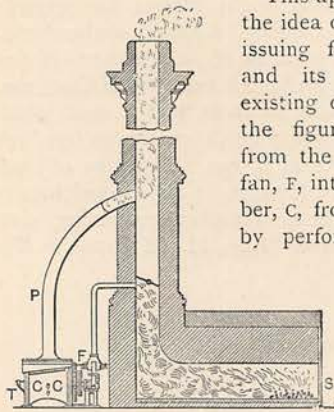
Preserving Butter.

According to the *Revue Industrielle*, butter can be preserved without loss of taste by enclosing it in an iron holder filled with carbonic acid gas at a pressure of six atmospheres. Experiments have shown that it can be kept fresh in this way for five weeks.

A Stereorama.

A new attraction has been added to the Eiffel Tower in the form of a "stereorama," showing different views of the late Paris Exhibition. The views are fifty in number and arranged in a circle round the interior of a cylindrical pavilion, which is lit inside by a powerful arc lamp. The spectators take their seats at the lenses or peep-holes on the outside of the pavilion, which rotates in such a manner by automatic mechanism that all the views are brought under their eyes in succession.

A New Smoke Annihilator.



This apparatus is based on the idea of washing the smoke issuing from a furnace flue, and its application to an existing chimney is shown in the figure. The smoke, *s*, from the flue is sucked by a fan, *F*, into a revolving chamber, *C*, from which it escapes by perforations into an enclosing tank, *T*, partially filled with water. There are blades on the outside of the revolving chamber, *C*, and these mix

up the smoke with the water, while the gases escape by the pipe, *P*, into the chimney higher up. The chamber and fan are driven from any convenient source of power. Exhaust steam is sometimes admitted with the smoke into the tank. The black scum which collects in the latter is drawn off from time to time.

Poisonous Mussels.

Healthy mussels are not poisonous, but when they live in water which is tainted with sewage they are apt to become so. The death of a lady and her four daughters some time back, in Ireland, was caused by eating mussels from a tidal pond into which some sewage flowed. It appears that when the muscular tissues of vertebrate and invertebrate animals undergo putrefaction, certain poisonous alkalis, such as lutidine, collidine, and pyridine, are formed. The two last-named substances have been isolated by a chemist from the muscular tissue of a cuttle-fish.

Kerosene and Spiders.

A correspondent of the *Scientific American* points out that kerosene has the power of attracting and destroying spiders. A cup placed under the tap of a kerosene reservoir to collect the drops was found to draw the insects by its odour and quickly destroy them.

Trepanning for Idiocy.

Microcephaly, or insufficient growth of the skull, may cause a virtual idiocy, by arresting the development of the brain; and an interesting and successful operation has recently been performed by M. Lannelongue in the Hôpital des Enfants, Paris. A girl of four years, born of healthy parents, evinced unmistakable signs of idiocy; she could neither walk nor speak, and took no interest in anything. M. Lannelongue, after mature consideration, lifted a slip of the skull, from 10 to 12 centimetres long, from the left wall; and a month later the wound had healed, the child could walk, had begun to speak, and showed the usual animation. Encouraged by this success, M. Lannelongue has since operated in a similar case, with every prospect of a like result.

A Submarine Spring.

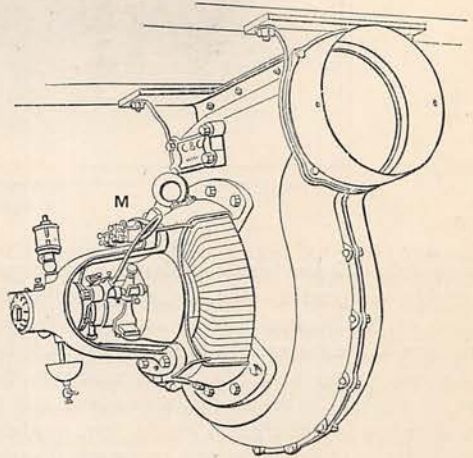
A submarine spring forms the water supply of the inhabitants of Bahrein Island, in the Gulf of Persia. The climate is very hot, no rain falls, and the people draw their fresh water from the sea-bottom by means of divers, who fill it into goatskins. Owing to the force of the spring, the diver uses a drag weight to keep him down, and after having filled the skin, he slips the drag and is floated to the surface.

Ramie for Silkworms.

A lady in Columbia, South Carolina, U.S., has discovered that silkworms will feed upon the leaves of the ramie or rhea plant as well as upon those of the mulberry and osage orange. Moreover, the cocoons thus produced were larger and the silk of finer quality than that from the mulberry. The information comes from our consul at New Orleans, and is given in a recent number of the *Kew Bulletin*.

An Electric Blower.

Electricity is now used for driving ventilating fans on board ship, and in other places where belts and pulleys are inconvenient. The woodcut illustrates a blower of this kind attached to the ceiling, and having



the electric motor, *M*, which drives the fan, arranged in a very compact and accessible manner. The current is of course conveyed to the motor from the generating dynamo by means of small insulated wires. The apparatus shown is now used on board the U.S. cruiser *Baltimore*, and discharges 1,425 cubic feet of air per minute.

The Polyphone.

A little time ago, M. Zigang, a French electrician, adapted the magneto telephone of Professor Bell, so as to make it emit a continuous musical note of itself, without anyone singing into or otherwise actuating it. This he accomplished by causing the vibrating plate to make and break the circuit of the magnet coil while an electric current passed through the coil. At each vibration of the plate the current was made and

broken, and thus the plate was kept in continuous vibration, and a musical tone corresponding in pitch to the fundamental note of the plate produced. Obviously, with a variety of these in operation, it became possible to play an air, by stopping and starting the notes. M. Zigang has, however, now simplified the apparatus, through finding that if the same plate is touched at certain points with the point of a stylus while it is vibrating, the pitch of the note can be changed; and thus he is able to produce a number of notes from one apparatus, or "polyphone," as it is called, and to play a simple tune.

The Small Toe.

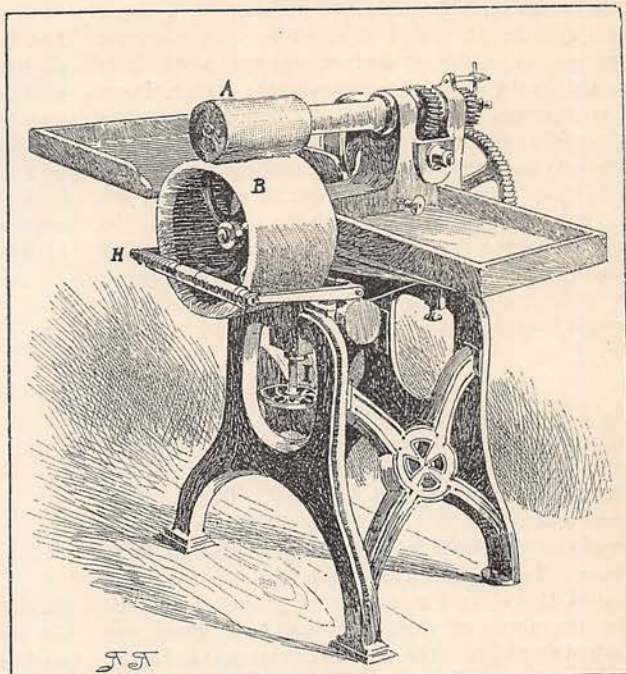
Herr Pfitzner, a German investigator, has made a large number of observations on the small toe, and finds that in the case of 31 per cent. of the male sex, and 41½ per cent. of the female sex, it is in process of degeneration, through the terminal bones fusing into one piece. The phenomenon is not confined to adults, but is equally common amongst children, and Herr Pfitzner does not regard it as an effect of wearing shoes. Whether the process will continue until the fifth toe is eliminated altogether is, of course, uncertain.

An Ironing Machine.

The figure illustrates an improved machine for ironing linen cuffs, collars, and fronts. The top roller A is of polished steel and heated inside by means of gas. Perforators in the end of this roller admit air to the flames and allow the fumes to escape. The lower pulley B is padded on the surface, and the handle H presses it against the ironing roller A, while the small hand-wheel I, seen below, is used to vary the pressure between the two rollers as the linen passes through. Several manufacturers of cuffs and collars are now using the machine.

A Pioneering Boat.

The portable boat which is shown in our engraving has been constructed of galvanised steel for the use of the Universities Mission in Central Africa. It is 14 feet long by 4 feet wide, and weighs about 5 cwt.



AN IRONING MACHINE.

The seats and thwarts are made of teak, and the floor of pine. There is a packing of india-rubber between the frames of the shell, and the whole can be taken in pieces or put together in a short time. It is eminently adapted for pioneering work in Africa.

The Growth of Boys and Girls.

Recent measurements made by Herren Geisler and Ulltich on school-children at Freiberg, in Saxony, show that between the ages of eleven and sixteen girls are generally taller than boys, and that the boys then overtake the girls and keep the lead. The same thing was observed in American children by Dr. Bowditch of Harvard, some years ago, and by Mr. Charles Roberts in England.

The Siemens-Violle Standard of Light.

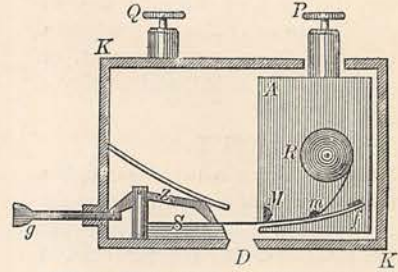
The international standard of light is the quantity of light emitted by a square centimetre of melted platinum at the moment of solidification. M. Violle, the originator of this standard, has devised an apparatus for producing it in practice; but it is somewhat inconvenient, and with the aid of Dr. Werner Siemens the following apparatus has been introduced as a substitute. In it the electric current is employed to fuse the necessary area of platinum foil, and the standard is the quantity of light emitted from it at the moment of fusion. If it should be found to vary to any material extent from the Violle standard, a correction will be applied when the latter has been determined once for all by careful experiments. The apparatus consists of a small box K K, shown in the figure. On the bottom of the box is an insulated plate A, carrying a small drum of platinum

strip or foil R, a movable half-cylinder *m*, a larger fixed cylinder M, and a terminal P. The platinum strip passes under M and *m*, against which it is pressed by the spring *f*, and runs to the plate S, where it is clamped by the claw Z. The strip is then tightened by turning *m* backwards, and the current of electricity sent through it by way of the terminals P, Q. This melts the platinum between M and Z, and the light emitted is observed through the aperture D. To repeat the operation, the handle *g* is pressed, thus pushing S and Z forward, at the same time lifting Z. On pulling *g* back, a fresh supply of platinum is brought into place and rendered incandescent as before.

The Barking Sands of Hawai.

In a former GATHERER we gave an account of the sonorous sands of the Jebel Nagous or Bell Mountain on the Gulf of Suez, which had been examined by Dr. Julian, of New York, and Mr. H. C. Bolton. The latter has recently paid a visit to Hawai in order to investigate the so-called "barking sands" of these islands. There is a tract of these sands on the south coast of Hawai, in the district of Mana, where they take the form of dunes or sand-hills about one hundred feet high. The sand is calcareous, and apparently a mixture of broken coral and shells. When they are dislodged from the side of a dune by the feet, they slide down the slope with a deep bass tone which

can be heard over a hundred feet away. The noise has been likened to the hum of a buzz-saw in a planing mill, and the note is much the same as that emitted by the sands of Jebel Nagous. When two quantities of the sand are separated in a bag and forcibly brought together, the shock is accompanied by a curious hooting noise. The drier the sand, the louder the sound. A bag of the sand will preserve its sonorous property for a considerable time. The natives of the island attribute the sound to the com-



THE SIEMENS-VIOILLE STANDARD LAMP.

plaints of the spirits of the dead who, according to an old custom, were buried in these dunes. A similar sand is also found at Niihan, another island of the group. Mr. Bolton believes the phenomenon is due to films or cushions of air, capable of vibration, surrounding the dry grains of the sand.

THE £80 PRIZE STORY COMPETITION.

THE Editor has pleasure in announcing the award in the £80 Story Competition, which, owing to the large number of MSS. received, is somewhat later than was originally anticipated. The competition has been in every way a success, and we must congratulate the competitors on the high standard of the work sent in. It will be seen that (on account of this MS. being nearly up to the mark of the second-prize story) an extra, or third, prize of £50 has been awarded. Many of the other stories, although not gaining a prize, are exceptionally good, and far above the average. But the following author certainly heads the list, and therefore

The FIRST PRIZE of £80 is awarded to—

CONSTANCE E. C. WEIGALL,
12, The Avenue,
Sunderland.

The SECOND PRIZE of £60 to—

FAY AXTENS,
48, Fernbank Road,
Redland, Bristol.

The EXTRA PRIZE of £50 to—

EDITH LISTER,
41, Campbell Road,
Southsea.

The MSS. in the Four-Part Story Competition are now under detailed consideration, and the award will be made known as early as possible.