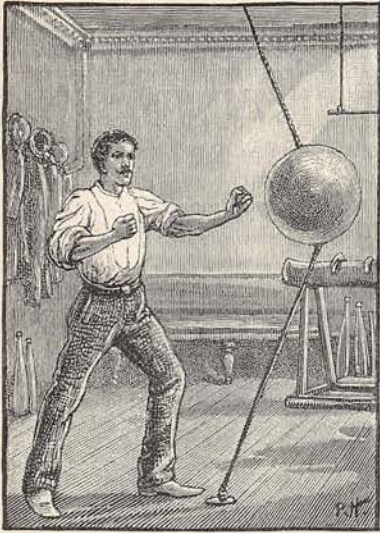


## THE GATHERER:

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.

## A Simple Mode of Exercise.



cles of the frame are brought into play. It has been adopted in many schools and gymnasia.

## A Petroleum Miner's Lamp.

The Thornebury miner's lamp is an improvement on the older patterns in several respects. It gives a much better light to begin with, the flame being equivalent to one and a half candles, whereas many of the older lamps yield only half a candle power. A heavy petroleum of high flashing point ( $250^{\circ}$  Fahr.) is burnt; and the arrangement is such that the lamp is self-extinguishing in currents of an explosive mixture of air and fire-damp. According to tests by Sir Frederick Abel and Professor Dewar, the light went out in a few minutes when the lamp was held in explosive currents having a velocity as high as fifty feet per second, or 3,000 feet per minute. The lamp is simple in construction, and both the gauges and chimney can be inspected without unlocking it.

## Electricity and Light.

Professor Hertz, of Vienna, has recently made a number of remarkable experiments tending to support the theory of the late Clerk Maxwell, that light and electricity are both phenomena of the luminiferous ether. It has long been known that the velocity of light—192,000 miles a second—is about the same as the velocity of electricity. Professor Hertz, in experimenting on the discharge of Leyden jars and electrical machines, now shows that electric waves are produced in the ether by such discharges, which

The wood-cut illustrates a very simple and inexpensive device for exercising the eye and muscles in a chamber. It will be seen to consist merely of an elastic ball, tethered above and below; but in dealing it blows and dodging its movements all the mus-

appear to be identical in kind with the waves of light, and differ only in dimensions. They are much greater than the waves of light; but he thinks that if we could produce them of the same size, we should be able to make light. They can be reflected, refracted, and polarised, like the waves of light, and they are propagated through the ether with the same velocity.

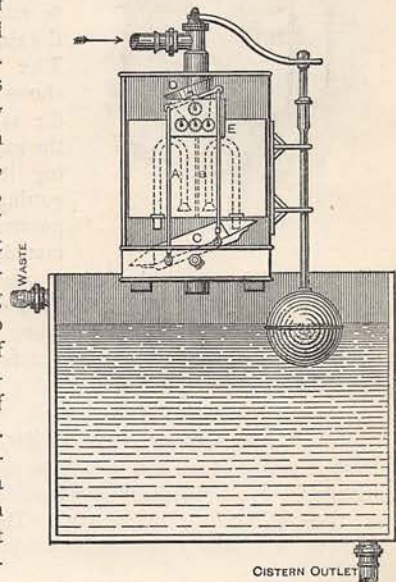
## A New Lipped Saucepan.

Cooks will be glad to hear of a new maslin saucepan that has just been patented by a Bewdley firm. It is cast entirely in a brass that is absolutely free from lead, and will not chip, break, or discolour, if fairly used. For boiling milk or cooking such dishes as blanc-manges or gravies, saucepans of this material ought to prove very serviceable and advantageous.

## The Syphon Water-Meter.

Cowan's syphon water-meter belongs to the class of "low-pressure" meters, and can be used either with a cistern or without. Our illustration shows the internal arrangement of the meter used with cisterns.

The water is admitted, by the operation of a ball-valve, into the meter, as indicated by the arrow. It passes by a reciprocating funnel, D, into one or other of two compartments, A B, of the meter. Each compartment has a syphon, which discharges it into the cistern. The outlet of each syphon is situated over a swing bucket, C, and as either end of this bucket is filled alternately by its corresponding syphon, the bucket rocks on its pivot, and works the reciprocating funnel so as to fill each compartment, A, B, alternately, while at the same time it actuates the counters, E, and indicates the quantity of water received.

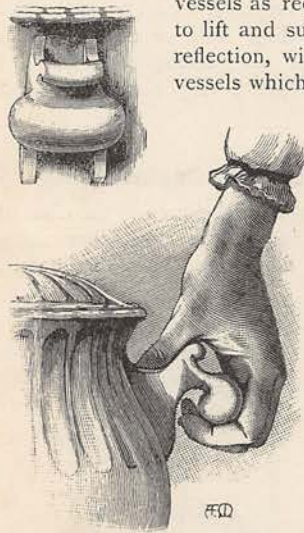


### The Phonograph and Hearing.

M. Lichtwitz, a French *savant*, has suggested the use of the new Edison phonograph by aurists to test the hearing powers of their patients. The phonograph can utter all the sounds of speech, and the loudness can be graduated, while all the instruments are made alike, so that results obtained in one place are comparable with those of another. It is proposed to form phonograms into an acoumetric scale for the examination of the hearing. Another suggestion with regard to this ingenious instrument is that the appearance of an orator in delivering a speech might be preserved in a series of lightning photographs, say ten a second, and reproduced by a magic lantern while a phonograph is uttering the speech, so that posterity might have a fair idea of the manner of its delivery.

### A New Handle for Crockery.

The accompanying woodcut represents a new form of handle introduced by Mr. F. W. White. It is designed to supersede the old open handle in such vessels as require considerable force to lift and sustain. Our readers, on reflection, will call to mind several vessels which cannot be conveniently

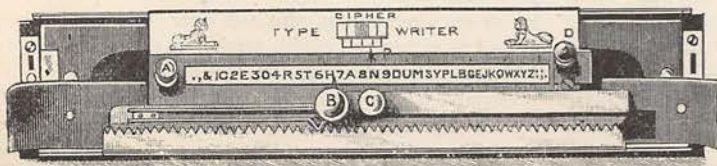


raised and held up without putting the thumb into the lip of the vessel as well, a practice sometimes objectionable. The new handle avoids all necessity of touching the rim of the vessel. The illustration shows how the handle is formed, and the manner of grasping it; the thumb getting the necessary purchase on a lip moulded on the handle itself.

This handle has some other advantages; it is not liable to be knocked off, or broken, and it affords good leverage in holding. Apart from household purposes, it may be useful to chemists, grocers, and others.

### A Cipher Type-Writer.

A type-writer which can at will be caused to print a message in cipher without any trouble to the writer has been recently brought out. The machine is small in size and comparatively simple in make.



When it is desired to write the message in cipher, that is to say as a cryptogram, the pointer P in the figure is moved by the stud D to right or left as the case may be, and the relations of the types are thus changed, so that in working the instrument in the ordinary way, a different set of the types to that of the message is substituted. The recipient of the cipher messages must know how to set the pointer of his instrument to correspond with the sending machine, and then by copying the cipher message in his machine he gets the true message of the sender. The plan admits of only four changes, but the types themselves are movable and can be placed in any order, and thus a great variety of ciphers can be introduced. The printing is effected by the studs A and B, while the spacing is controlled by C.

### The Nampa Image.

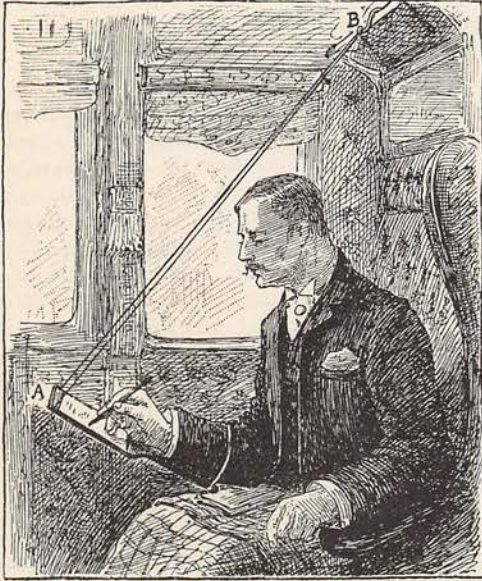


The image of a man recently brought up to the surface from a bore-hole 320 feet deep, at the Nampa station of the Oregon Short Line Railroad in Idaho, is believed by some to be the earliest specimen of human handiwork yet found. It is carved in pumice stone, which has become covered with a coat of red oxide of iron, and its general appearance will be gathered from our illustration. According to Mr. Emmons, of the United States Geological Survey, the sand-beds in which the curio was found have been formed by the damming of the Snake River by a flood of lava; and these beds have subsequently been covered by a stratum of lava, through which the bore-hole passed before it reached the sand-beds. Professors Putnam and Haynes are satisfied of the genuineness of the discovery, which appears to bear out the theory that men were more advanced formerly on the Pacific Slope of America than on the Atlantic Slope, and perhaps also in Europe at the same period.

### Edible Flowers.

The flowers of the *Calligonum* are, according to Mr. Duthie, botanical director for Northern India, mixed with flour and eaten with salt, or other condiments, by the poorer classes of North-Western

India. A little "ghee" is added as a luxury by those who can afford the expense. The flowers are swept off the ground, and kept over-night in a closed vessel of earthenware, so that they are faded in the morning. In this condition they will keep for a long time.



**A Railway Writing-Desk.**

A writing-tablet or portable desk, for writing in railway or other carriages where there is considerable vibration, is shown in our figure. It consists of a writing-tablet, A, which is fastened under the right fore-arm, and likewise suspended—as shown—from the luggage rack or other convenient point, by means of a cord and hook, B. Thus fastened, it is freed from much of the jarring and jolting of the vehicle.

**More New Parlour Games.**

"Quoitac" and "Slidit" are the very expressive names of two little boxes of games which have just been patented by a Yorkshire inventor. Each box contains a number of counters—eight large and sixteen smaller ones—variously coloured, and by means of these quite a host of new games may be played, in accordance with the rules contained in the book that accompanies each box. For some of the games figured squares are to be drawn on the table-cloth, and the counters thrown, shot, or otherwise propelled into them. In other cases the box serves as a sort of well, into which the counters are to be manoeuvred. Though the requirements for these games are very few and readily procurable, they offer infinite possibilities of amusement for both young and old.

**A New Grotto.**

A wonderful cave has been discovered near the well-known cavern of stalactites at Adelsberg, in Carniola, Austria. The interior is of snow-white colour, relieved here and there with grey; and the

extent is such that two hours are occupied in walking through it. The entrance is ornamented with stalactites in the form of curtains, and stalagmites resembling cactus plants. The next gallery contains a multitude of stalactites bearing the form of wild animals, which puzzle and amuse the spectator. After passing under several lofty domes a large hall is reached, adorned with hundreds of white flags and streamers, suspended by hollow tubes of calcareous matter. The walls appear to be spangled with diamonds, which glow with colour when it is lighted up. The last apartment is vaulted, and contains a grove of marble-white trees in the middle, rising to a height of forty or fifty feet.

**Aërated Water on Draught.**

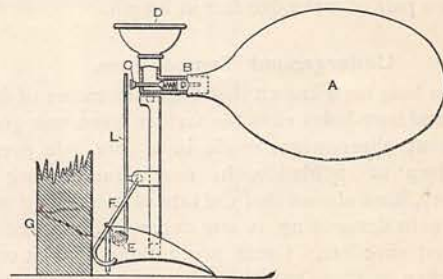
The "tubes" hitherto used for storing nitrous oxide gas are now employed to transport liquefied carbonic acid. The gas is obtained in a pure state from the Eifel mountain springs east of the Rhine. By connecting a tube to a copper cistern containing water the liquid can be aërated with the gas in a simple manner, and the aërated water kept on draught.

**A Sheep-shearing Machine.**

Mr. F. Y. Wolsley, a brother of Lord Wolsley, has invented an ingenious machine for fleecing sheep. It consists of a steel comb with curving teeth, which catch the wool while a three-bladed cutter traverses it, and shears away the fleece. The machine is driven by a small motor—for example, a Priestman kerosine engine. It is capable of shearing 115 sheep a day, and it is stated to cut so cleanly and safely that left wool can be gleaned by it after the sheep has been clipped in the ordinary way. Experiments made at Melbourne show that it can shear a sheep in from three to five minutes.

**A Bagpipe Burglar-Alarm.**

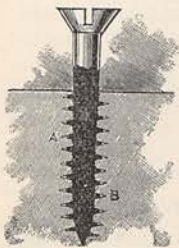
Our figure shows an ingenious little burglar-alarm, which may be described as an automatic bagpipe. The device is represented by D F, an upright stem



which is firmly planted on the floor by its pointed feet, E, just behind the door of a room, G, or on the sash of a window. When the door is pushed open, it presses on the bent lever, F, and allows the spring, L, to press on the spring-valve, C, thus opening a passage for the air in the wind-bag, A, to escape through the reed-pipe, B, and sound a piercing note of alarm. The mouth-

piece, D, is used to inflate the wind-bag in setting the alarm. It will be understood that the device is so firmly set in the floor or sash that the door cannot be pushed open beyond the fraction of an inch necessary to sound the alarm, so that, in any case, no one can enter. The apparatus goes into a small box, and spare wind-bags are provided. It will be useful to travellers who are afraid of intruders into their chambers, as well as to householders in districts liable to burglary. A larger and more powerful form of the apparatus, with a concertina bellows, is also provided for halls. Both of these can be worked by electricity if desired, the current being established by the burglar in opening any door or window of the house, and electro-magnets opening the valves.

#### A Rolled Screw-Nail.



Screw-nails for timber are now made, without cutting the metal, by rolling wire of soft open-heap steel in a series of dies until the thread is sufficiently formed. The figure shows one of these screws in a die, with the thread, A B, partially formed. The work is done by a machine, which turns out fifty screws a minute.

#### A Famous Elephant.

The Ceylon papers recently announced the death of Sella, an elephant which served the Public Works Department for over sixty-five years. It belonged originally to the last King of Kandy, and passed with about a hundred others to the British Government in 1813, when the Kandyan dynasty was overthrown, and the whole of Ceylon passed into British hands. In 1880 Sella was sold to Mr. De Soysa, a well-known resident of Colombo, with whom it has remained. Sella was very gentle and a steady worker all its life. It aided in several hunts for the capture of wild elephants. Three years ago it became totally blind, but continued to draw the plough until a short time before its death. Sella stood eight feet high, and carried a pair of tusks five feet in length.

#### Underground Temperature.

It has long been known that the temperature of deep mines and bore-holes rises the further down one goes; and recent observations made in a bore-hole over a mile deep at Schladebach, near Duerrenberg in Germany, have shown that the rate of increase of temperature in descending is one degree Fahrenheit for every sixty-five feet. Great precautions against error were taken in these experiments, which appear to be the most reliable of their kind yet made.

#### The Pulsion Telephone.

This apparatus is a new mechanical telephone, that is to say, an improved form of the lover's or string telephone, in which the vibrations of the voice are caught on a diaphragm and transmitted along a wire

to a similar diaphragm at which the correspondent listens. No electricity is used in connection with the "Pulsion" telephone, which consists essentially of a metal diaphragm and a steel wire connected to it. The former corresponds to the parchment of the lover's telephone, and the latter to the string. As tried recently at Glasgow over a wire a third of a mile long, the sounds were clearly audible.

#### Microbes in the Soil.

M. Schloesling has made a series of experiments tending to confirm the supposition that certain microbes in the soil secrete nitrogen from the atmosphere, and thus help to fertilise it. Farmers have a partiality for ordinary manure as distinct from artificial fertilisers, and it may be that the former is richer in these nitrogenous microbes. We may add that recent experiments of M. Berthelot, communicated to the French Academy of Sciences, have shown that electrifying soil causes it to gain nitrogen either under the influence of vegetation or without it. It is understood, however, that the soil without vegetation contained microbes. It would thus appear that electricity had a stimulating effect in the fixation of nitrogen in the soil.

#### A New Back-Band for Harness.



FIG. 1.

The leather back-band of the saddle which supports the shafts of a vehicle is commonly made in one piece, and hence is apt to wear as shown at A in Fig. 1 when the vehicle is on an incline. By a recent improvement the band is now made in three pieces, with

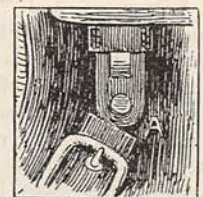


FIG. 2.

a joint at A on both sides, as shown in Fig. 2. This device allows the band to shift without cracking when the horse is going on steep gradients or through a narrow stable door.

#### Sisal-Hemp.

Sisal-hemp, or hennequen, which affords a strong fibre, not inferior to Manilla hemp, has proved a source of prosperity to Yucatan, from which it is exported in large quantities to New York. The wild grass has recently been cultivated in the Bahama

Islands, where it flourishes on waste and rocky lands, avoided by the cattle. It promises to become a valuable export, and the Governor of the islands estimates the value of the crop at fifty dollars an acre, a price which is considered below rather than above the mark.

#### A New Siemens Furnace.

Messrs. Siemens were the first to heat both the gas and air supplied to a gas furnace, and now they have introduced a furnace which recovers and utilises the waste gases and waste heat. We need not enter into the details of this contrivance, which are somewhat complicated, but will content ourselves with giving some account of its performances. The first of the kind was constructed at Wishaw, for the Pather Iron and Steel Company, and the results of six months' working have shown an average saving of 5 per cent. in waste on the weight of iron heated, and a saving of over two-thirds in the weight of coal consumed in making the gaseous fuel. The total saving effected is estimated at 18 tons of coal per week for a furnace heating 8 tons of iron in a shift, and the money saved in iron and coal per annum exceeds £1,000. The new furnace has recently been applied for heating the billets of the United Horseshoe Company.

#### Banana Fibre.

A German consular report recommends the utilisation of the fibres of the banana plant for industrial purposes. The leaf contains a very tough fibre, which is used by the Indians of Central America for making carpets, hammocks, strings, and other things. Paper, coffee-bags, and ropes of great strength might very well be manufactured from the fibre.

#### Light in the Sea.

Further experiments by M. Fol made from his yacht the *Amphistre* while cruising between Corsica and the mainland, have shown that in July, when the sun was 68° above the horizon, his rays penetrated 465 mètres into the sea. In March, when his altitude was only 48°, the depth to which the light descended was 380 to 400 mètres. These results were obtained by submerging very sensitive photographic plates of the gelatine-bromide order, and exposing them for ten minutes.

#### An Ink Plant.

In New Granada, South America, now commonly known as the United States of Colombia, is found a plant (*Coriaria thymifolia*) whose juices serve as a capital ready-made ink, and which is in consequence known as the "ink plant." At the time of using, the ink is of a reddish colour, but speedily assumes a black hue. It is said that it is entirely free from the corrosive properties of ordinary ink.

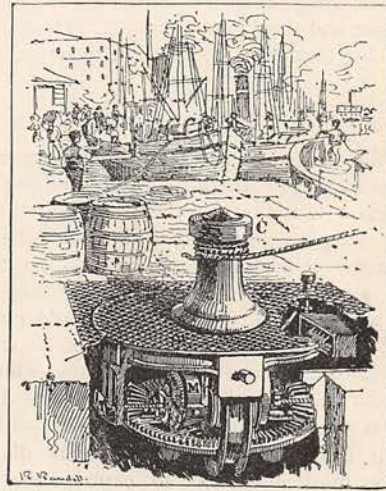
#### Utilising the Waves.

At Ocean Grove, on the Atlantic coast of the United States, the power of the waves has been simply utilised to pump sea-water into a reservoir

forty feet high, in order that it might be made useful in flushing the drains and watering the streets. Between two piles of the pier a swing door was arranged so that the force of the waves in striking it made it oscillate, and the motion thus obtained was by a system of mechanical gearing caused to work the pump and raise the water. Some forty thousand gallons of sea-water were in this way supplied to the reservoir in a day.

#### An Electrical Capstan.

A novelty in electrical traction is the capstan used at the Gare de la Chapelle, Paris, for hauling purposes. The capstan-head, C, in the figure is rotated by means of an electric motor, M, geared to it below the platform



as shown. Sacks are also transported along a single rail by means of small electric locomotives, with hooks below to hang the sacks upon. At the recent Paris Exhibition a travelling hoist for staircases was shown in operation. Two rails, one above the other, were fastened to the balusters of the stair, and an open carriage mounted on them, propelled by electricity. It was so constructed that a person could easily step on or off at will, and its purpose was to lift visitors up the stairs of houses to any flat.

#### A Subterranean River.

Two explorers, M. Martel and M. Gaujullat, have discovered an underground river in the district of Miers, which is situated in the department of Lot, in France. The country around is wild and mountainous, with caves and grottoes in its recesses. At the bottom of an abyss known as the Pit of Paderac the explorers found the entrance to the river, and having procured a canvas boat, they followed the stream for two miles through a series of grottoes, ornamented with stalactites. In the course of the voyage they traversed a chain of lakes or ponds, and shot a number of rapids. The river is believed to join one of the head-waters of the Dordogne, six miles distant from its mouth; but further explorations will be attempted.

### A Highland Torquay.

The Kyles of Bute is one of the most picturesque inlets on the coast of Argyleshire, that county of wild scenery. It is situated, as is well known, between the Island of Bute and the district of Cowall on the mainland. Rothesay in Bute has long been famous for its mild winter climate, and has been called the Madeira of Scotland; but Tignabruaich (that is, in English, the town on the brae), a little watering-place in the Kyles, is believed to rival it in the matter of climate, while far exceeding it in the magnificence of its outlook. According to observations, the winter temperature of Tignabruaich is as warm or even warmer than that of Torquay in South Devon; the snow, which seldom falls, does not remain, and the hills around shelter the town from the western gales as well as the north-east winds. Fogs are rare and sunshine is common, so that invalids are beginning to make it their winter quarters.

### "Star-Land."

That children are better for learning something at least of the wonders of the night-sky no one can doubt. Their interest in the stars is almost proverbial, and the utility of a good grounding in the ascertained facts of astronomy immeasurable. Sir Robert Stawell Ball has done for young readers in "Star-Land" (Cassell) what he has already done for older readers in "The Story of the Heavens." The later book consists in the main of the lectures which Sir Robert delivered to children at the Royal Institution. It is copiously illustrated, not only with star-maps, but also by numbers of homely diagrams, that serve most admirably to explain the letter-press. Sir Robert is past-master in the art of "writing down"—in the best sense of the term—to juvenile readers, and we commend his work to the notice of all heads of families while the stars are still visible at an hour when young eyes may not imprudently be invited to watch them.

### The Exploration of Palestine.

Major Conder has been so intimately connected in the mind of the reading public with the work of the Palestine Exploration Fund, that it was a happy thought on the part of the editors of "The World's Explorers and Explorations" (G. Philip & Son) to ask him to contribute a volume on his experiences to the series. The volume is now before us, presenting a most graphic account of travel and labour in modern Palestine, illustrated by numerous engravings of storied sites, and accompanied by a collection of most useful maps. Work on the part of Englishmen in such a climate as that of the Holy Land is necessarily difficult, and it is not surprising to read in Major Conder's narrative of his party being delayed from time to time while one or all of its members were ill. But this and all other incidental difficulties were cheerfully faced by Major Conder and his assistants, and the result was the eminently successful survey that gave rise to this most interesting volume.

### By-Ways of Nature.

A paper read by Mr. John Stuttard, before the Rochdale Literary and Scientific Society, has been expanded by its author into a handy little volume under the title "The Butterfly: its History, Development, and Attributes" (T. Fisher Unwin). It does not profess to set forth new entomological theories; it simply and very practically describes its author's experience, and that in a manner which must attract increased attention to this branch of natural history on the part of its readers. In this connection we may notice a new edition of a very pretty collection of "English Idylls" (Sampson Low & Co.) by Mr. P. H. Emerson. Like Mr. Stuttard, he is a keen observer of nature, and makes good use of his observations. But some of the character-sketches in these "Idylls" are very attractive. There is a wonderful freshness and breeziness about the volume, that is sure to endear it to lovers of the country and the sea.

### Books Worth Reading.

Mr. Rider Haggard has a brother, who seems to share his love for the adventurous and wonderful in fiction. In "Dodo and I" (Blackwood), he has given us a story, very readable as such, and full of incident and marvel. "Barbara Allan" (same publishers—two vols.), as its sub-title "The Provost's Daughter," by R. Cleland, tells, is a Scotch story. Still, it is not too Scotch for the most Saxon of readers to be able to appreciate it. The motive of the story is not a new one—a father's wrong-doing, and his daughter's suffering. Barbara is a good character in every way, and the reader feels satisfied when he leaves her with her husband in their new home across the Atlantic. "Polly," the new-fashioned girl, who plays the title-rôle in L. T. Meade's story (Cassell), is another good heroine, for the sake of knowing whom alone the tale is well worth reading. Mrs. Meade is always happiest in her girl characters, as readers of "Engaged to be Married" in our own pages last year must know. Despite its rather forced title, "Another Such Victory," by Annette Lyster (Blackwood—three vols.), is very readable. It might fittingly be described as a story of mistakes, but all the mistakes are properly rectified by the time the third volume closes, with the setting right of the greatest mistake of all—the estrangement of husband and wife. "Dr. Hermione" (same publishers) is good, and possesses the merit of being comprised in a single volume. Tom Thornton is, to our mind, the best of its characters, but the two blue-stockings are charming. No doubt all readers will do as the worthy Dr. Jones advises the heroine to do—remember that she was "Dr. Hermione," although she ends up as Mrs. Thornton. "The Splendid Spur" (Cassell) is the latest story by "Q," who gave us "Dead Man's Rock," and inimitable "Troy Town." This new story calls to mind the former rather than its successor, although it takes us back to the days of the great Civil War. There is abundance of incident in the volume, but plenty of love as well—so all tastes ought to be gratified.