

## III.

The flat rock of Tiryns where Dr. Schliemann made those highly important discoveries, is, according to a former statement of his, 900 feet long, from 200 to 250 feet broad, and from 30 to 50 feet high. It extends in a straight line from north to south, and its margin is lined by a so-called Cyclopean circuit wall, which is from 25 to 50 feet thick, and in a pretty good state of preservation; but it is not always massive, being traversed by interior passages or galleries with ogival vaults. One of these galleries, which is 90 feet long, and 7 feet 10 inches broad and high, has in its outer wall six gate-like recesses or window openings which reach down to the bottom. These niches were probably intended for archers, whilst the galleries themselves must have served for covered communications, leading to armouries, guard-chambers, or towers. One of the galleries seems to have served as a sally-port, and was probably concealed in some way or other.

On the eastern side is the only gate, which is 15 feet broad. It is approached by a ramp, 20 feet wide, which is supported by a wall of Cyclopean masonry. The right flank of the gate is defended by a tower 43 feet high and 33 feet broad, which may have procured for the Tirynthians the credit, attributed to them in Greek antiquity, of having been the first to build towers. Such is the description given by Dr. Schliemann after his earlier excavation at Tiryns.

A Viennese archæologist, Dr. Moritz Hoernes, who, after the discovery of the prehistoric palace, went to Tiryns with a letter of introduction to Dr. Schliemann, makes a number of interesting statements on the architecture of this stronghold and the traces of its destruction, as well as on its wonderful remnants. He says that, near the gate, "the circumvallation still overtops the castle, and that there, in the narrowness of the

gloomy gateway, the eye is impressed with twofold weight by the masses of stone heaped up on all sides. At this place the onlooker gets a truly overpowering sensation of the whole prehistoric settlement. A feeling is created that we are here on the threshold of an architectural development which forms a transition to the Lion Gate of Mycenæ, so that the latter archaic work, though it gives rise to such wonderment, already appears to be something more recent and more refined."

At the door and window openings of the Tirynthian Castle, Dr. Hoernes found the stone had been burnt into a chalky, the clay into a bricky, mass. Otherwise the ruins are in a good condition. In the great fire which raged over it—no doubt after a siege, as at Troy—all the numerous wooden door and roof columns, and the roof itself, disappeared; but the places of the columns are still discernible by slight circular elevations of the floor.

Near the door-sills of each room—Dr. Hoernes continues—the bases of two columns, as well as the faucet-holes of the folding-doors, are still to be observed; both columns and doors having been of wood. In a large ante-room there is a square structure to which steps lead up from the door. Dr. Schliemann holds it to be an altar of the house-protecting deity (Zeus Herceios), in accordance with the custom mentioned in Homer. A great many rooms, divided by intervening walls, evidently formed at first a single hall—a throne-room, as the phrase would be now. In the centre of this splendid room there is a large circular cut in the floor, with four bases of columns placed in a square. Dr. Hoernes considers it a mysterious contrivance. But may it not have been a seat for a king, or a receptacle for house-gods?

(To be concluded.)

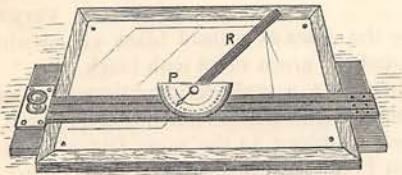
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## THE GATHERER.\*

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### A New Drawing-Square.

At the Building Exhibition, Floral Hall, Covent Garden, a new drawing-square was exhibited, which



we illustrate herewith. It consists of a double T or H square with two grooves in the blade, and the extra

head capable of being clamped to it so as to fix the square firmly to the drawing-board. A "protractor," P, for laying down angles, slides along the grooves of the blade by means of projecting feet on its under side. The rule, R, for drawing the inclined lines, has a double bevelled edge, and is fitted with a pointer, which indicates on the arc of the protractor the angle to be measured off. The new square thus enables the draughtsman to divide angles as well as draw polygons.

### Silicine Glass Painting.

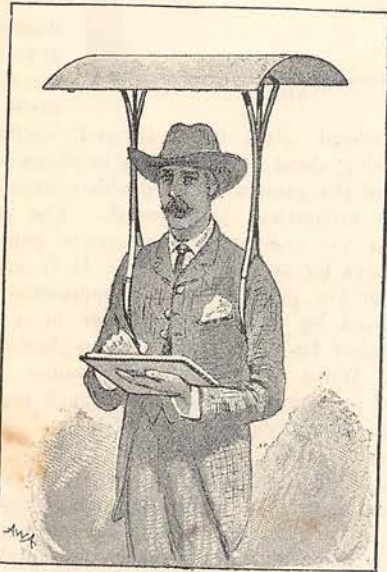
An inexpensive substitute for stained glass has recently been introduced. It consists in painting the glass with a peculiar kind of paint, termed "silicine," which, being transparent, gives to plain glass the appearance of being stained. It requires no burning in, or special treatment, and may also be used for painting lamps, screens, or magic-lantern slides.

\* 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. The Editor, however, cannot in any case guarantee absolute certainty of information.



### The Electric Light in the Bath-Room.

The purity and freshness of the electric light adapts it for use in bath-rooms, and it was recently installed in a well-known Turkish Bath in London. There are fifty-seven 10 and 20-candle Woodhouse and Rawson incandescent lamps in ornamental fittings, fed by a 60-light Elwell-Parker dynamo, driven by a 4 horse-power Clark horizontal gas-engine. We may add that in a textile and bleaching establishment in America recently the value of the electric light was clearly shown. Investigation of the goods showed that the pure white colour was seriously impaired by small carbon motes deposited from the gas burned in the works. Since the electric light was introduced, the goods turned out by the factory and bleachery are much improved in appearance.



A Novel Sunshade.

While the Ladies' National Aid Association—of which the Princess of Wales is President, and the Countess of Rosebery Treasurer—are using special efforts to promote the comfort and welfare of the British soldiers in the Soudan, and particularly of the sick and wounded, it is satisfactory to know that the authorities also are well aware of the dangers of the terrible climate of the desert, and that military operations will be suspended during the hot months. Sunstroke is one of the more serious risks to which the soldiers are exposed, and with a view to protect them from it, an ingenious contrivance has been devised which will, it is believed, effectually secure this end. This is a kind of sunshade made of bamboo and paper. A piece of cane, bent in the shape of an arch, is fastened on the shoulder of the wearer. In the centre of each arch there is a bamboo stick, eighteen inches high, and these sticks support an awning twenty-four inches long by eighteen broad. This awning has a bamboo frame, and is covered with paper painted green inside. It need hardly be added that the weight of this sunshade is almost inappreciable,

and that, while experiencing all the advantages of an umbrella, the soldier is left perfectly free to handle his rifle or other article. Perhaps some modification of this design may be introduced for the benefit of the civil section of the community.

### A Cure for Writers' Cramp.

Scriveners' palsy, or writers' cramp, which is also known to affect telegraphists, and is induced by the cramped position of the hand in writing or telegraphing, has not hitherto been successfully cured. Now, however, Dr. Julius Wolff has found a way of curing it by a system of "massage" and gymnastics. The "massage" consists in rubbing, kneading, stretching, and beating the fingers and muscles of the hand and arm. There are also gymnastic exercises both active and passive to be gone through; and, most important of all, there are graduated exercises in writing, which call into play a different set of muscles from those injured by the cramp, thus relieving these, while enabling the patient to continue his work. Left-hand writing or telegraphing is a suggestion also worth remembering in this regard.

### Map-Making by Dynamos.

In the operation of Government surveying itself, little has been changed of late; but in the means of publishing the plans an important improvement has recently been made. This is due to the advances recently made in the production of the electric current.

The change in question consists in the employment of the dynamo-electric machine for producing the copper plates from which the maps of the Survey are printed; and it is now being introduced at the Ordnance Survey Office, Southampton, under the supervision of Captain Sankey, R.E. The survey of a certain district, after being made on the ground, and recorded in the note-books of the surveyor, is first "plotted" or mapped on paper, then transferred to a plate of copper which is kept as a standard of reference. The published maps are not printed from this preserved plate, because the operation of printing tends to wear its surface and destroy the fine lines engraved upon it. The maps are in fact printed from a copy or duplicate of this plate, prepared from it by means of electricity, just as a *cliché* or electrotype of a pictorial woodcut is made by electro-deposition.

This electro-deposition is performed in large baths containing a solution of sulphate of copper, which is kept in movement by stirrers, so as to prevent the solution getting thicker at the bottom than at the top, and thus securing a deposit of uniform thickness. A current of electricity flows through this solution from a large copper plate or anode placed at the top of the bath, to the receiving plate or cathode at the bottom of the bath. It is found best in practice to keep the receiving plate or cathode below the anode or dissolving plate. Any one acquainted with the elements of electro-deposition knows that the positive current of electricity entering the solution by the anode deposits



pure copper from the sulphate of copper solution upon the surface of the cathode beneath; and that the place of the copper thus transferred from the solution to the surface of the cathode is supplied by the copper of the anode plate, which is consequently eaten away gradually as the process goes on.

In this way a "couch" or layer of pure copper is deposited on the cathode surface, and if the latter, as is the case, be engraved with the map or plan of a survey, the deposited copper layer is itself marked with all the lines of the survey. It reproduces in fact the original copper plate on which the survey is preserved. By this means fresh copper plates for printing purposes, with the survey traced upon them, can be multiplied at will.

Hitherto it has been the custom to produce these plates by the current from very large Smee cells—one cell being used for each bath. But this is a very expensive and troublesome plan. Experiments were therefore conducted during the past year by Captain Sankey, R.E., at Southampton, with a view to substitute the dynamo-electric machine for the Smee battery, and he has been completely successful.



FIG. 1.

**A New Sunshine Recorder.**

Professor Herbert Macleod has devised the elegant sunshine recorder which we illustrate in Fig. 1. It consists of a glass sphere, s, silvered inside and placed before the lens of a camera, c; the axis of the instrument being parallel to the polar axis of the earth. The light from the sun, being reflected from the globe, passes through the lens, and forms an image on a sheet of prepared photographic paper inside the camera. In consequence of the rotation of the earth, the image describes an arc of a circle on the paper; and when the sun is obscured, this arc is necessarily discontinuous. Moreover, it is sometimes fainter when the sunlight is feebler. The image is not a point, but

a well-defined line. Fig. 2 is a record of the sunlight at Cooper's Hill Indian Engineering College, for the 27th of June, 1884. In the morning the sun shone brightly, towards noon clouds began to form, and in the afternoon the sky was hazy. The instrument was placed in a field surrounded by trees, which cut off the ends of the line by their shadows. The apparatus in this case was made with a

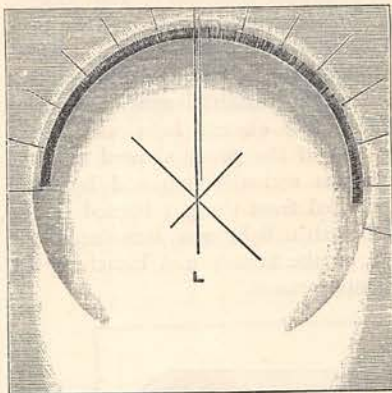


FIG. 2.

round-bottomed glass flask, silvered inside; the bottom being about 95 millimetres in diameter; and the lens of the camera was a double-convex lens of about 90 millimetres focal length. The sensitive paper was the ordinary ferro-prussiate paper used by engineers for copying tracings. It is very convenient for the purpose, as the impression of the line is fixed by washing the paper in a stream of fresh water for six minutes, and no chemicals are required. When the paper is dry, radial lines, at angles of 15 degrees, are drawn through the centre of the arc, thus giving the scale of hours. The time of apparent noon is given by the line passing through the plane of the meridian, that is to say, the line L bisecting the figure. With the alteration of declination of the sun, the light entering the camera is reflected from different portions of the sphere, and an alteration of the position of the focus ensues. This can be corrected by moving the sphere itself, while keeping the relative positions of the lens and paper constant.

**Improvements in Cooking Vessels.**

Authorities on the preparation of vegetables for the table agree that of all methods of cooking them that of steaming has most to recommend it, but to steam them thoroughly without their becoming sodden with water is not an easy task.

Mr. Payne has recently patented an improved steamer for which is claimed the merit of securing this advantage. In place of the ordinary upper pan



FIG. 1.

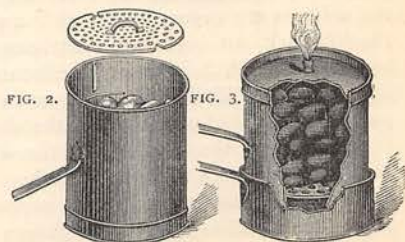


FIG. 2.

FIG. 3.



with movable lid and fixed colander bottom, the new steamer is closed at the top, save for a small steam nozzle, and the colander bottom is movable. In use the lower pan, Fig. 1, is filled with boiling water to about an inch of the brim, and the upper pan,

at right angles to each other. In these slots slide two pinions, C and D, making half a revolution at each forward and backward stroke of the drawing-pencil. The milled head, c, is for working the

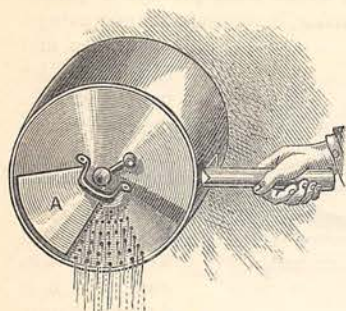


FIG. 4.

Fig. 2, with potatoes or other vegetables, and then the colander is fastened in its place by means of the little catch shown in the engraving; this pan is then reversed and placed in the water of the lower pan as shown in Fig. 3. The vegetables do

not come into actual contact with the water, but as the upper pans exactly fit one within another, the steam passes from the water in the lower pan through the vegetables in the upper, and escapes at the nozzle at the top of the latter. By this means the vegetables are thoroughly cooked, and as the steam merely passes through them they are not sodden. Mr. L. B. Bertram is the patentee of a new saucepan-lid which converts a saucepan into saucepan and colander combined. This invention is intended for use in boiling vegetables, or in the making of soups, stews, or gravies. Part of the lid is perforated, as shown in Fig. 4, and the perforations are covered by a moving shield, A, turning on a pivot in the centre of the lid. Boiling over may be prevented by merely moving the shield so as to open a few of the perforations, thus allowing the steam to escape; and all the liquid may be drained off by opening all the perforations and tilting up the saucepan, the lid being temporarily secured by a simple clip.

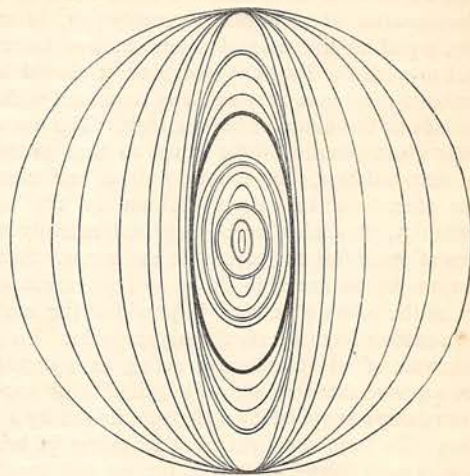


FIG. 2.

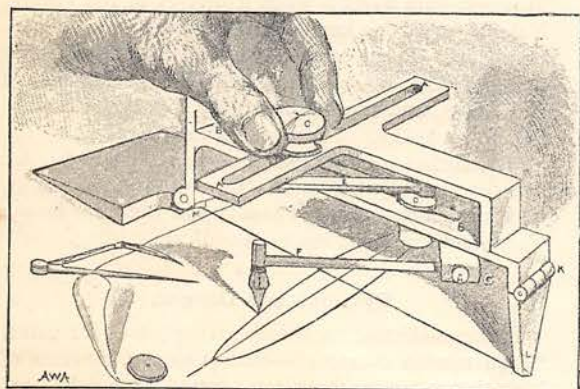


FIG. 1.

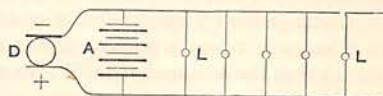
**A New Ellipsograph.**

The new ellipsograph which we illustrate is capable of drawing any ellipse between a circle and a straight line. It consists of a metal frame, as shown in Fig. 1, in which there are two slots, A A and B B,

pencil by. The arm E, connecting the two pinions C and D, has a right and left hand thread on it, starting each way from the centre, for adjusting the distance between C and D, according to the ellipse to be drawn. When the arm E is screwed tight, bringing the two pinions together, their centres coincide, and the pen or bar F describes a perfect circle. But as the distance between C and D increases so will the minor axis of the ellipse decrease, until the pen is brought under the centre of pinion C, when it simply draws a straight line following the slot A A. The major axis is varied by sliding the pencil or pen bar F backwards or forwards through the socket G, and fixing it by the set-screw H. To draw an ellipse larger than the instrument will span between L and M, the leg L is turned up by a hinge, K, and a longer pencil-bar inserted in the socket G. The apparatus is capable of being folded up, and is simple in construction. One with slots three inches long is suitable for engineers and draughtsmen, and larger sizes are useful for pattern-makers, marble-workers, and others. Fig. 2 shows the work of the ellipsograph.

**Accumulators as Electric Light Regulators.**

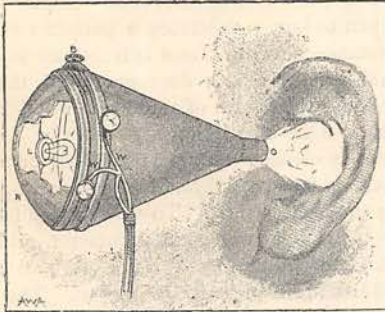
The storage battery or accumulator, when connected up across the poles of a dynamo-electric generator, or as an electrician would say, "in parallel," becomes a regulator of the electric



current in the outer circuit, and thus tends to keep a steady light in the electric lamps, although the dynamo is working irregularly and giving an unsteady current. Thus, in the diagram, if D be the



dynamo, A the accumulator, and L L the lamps, the current through the lamps will be practically even, although the dynamo is working irregularly. For this purpose the accumulator should have as many cells as will give a counter electro-motive force equal to that of the dynamo when working steadily; or, in other words, equal to the normal electro-motive force required to work the lamps. Moreover, it should have an internal resistance very small as compared with the resistance of the outer or lamp circuit. The use of a counter electro-motive force equal to that given by such accumulators, but obtained from an electric motor placed in the same position as the accumulators A, has also been suggested recently as a means of steadying the current in the lamps. Such a motor might be made to do some light mechanical work, at the same time that it provided the counter electro-motive force for regulating purposes. To give an example of an accumulator acting as a regulator, let us suppose that we have an installation of 100-volt Edison lamps supplied by a dynamo driven by a gas-engine. To keep the light from pulsating in brightness with each stroke of the engine, we can insert 50 cells of an accumulator, giving a counter electro-motive force of two volts each—that is to say, 100 volts in all. These cells, connected in series and placed across the poles of the dynamo, as shown in the diagram, will, if sufficiently large to have a low internal resistance (say  $\frac{1}{10}$  ohm), serve to keep the light steady.



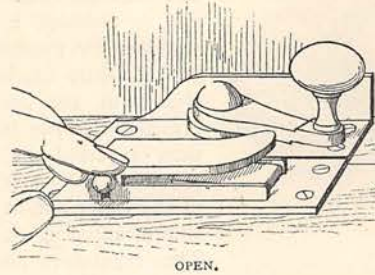
The Otoscope.

An apparatus for illuminating the interior of the ear, and termed the "Otoscope," has been devised by Dr. Rattel, and was recently exhibited at the French Academy of Medicine. It is illustrated in the accompanying figure, and consists of a small elliptical reflector, R, which is shown cut away in order to reveal the small incandescence lamp L, that is fixed in one of its foci. This reflector projects the light through the small orifice O, into the ear. The current to the lamp is brought by wires, W W, from an accumulator not shown, which yields 13 ampere-hours, and lights it for at least 6 hours to 2-candle power. By 13 ampere-hours is meant that the accumulator will give a supply of electricity equivalent to 13 amperes for an hour, or 1 ampere for 13 hours. A rheostat, or adjustable resistance, in circuit with the lamp, enables the strength of the current to be moderated, and the brightness of the lamp regulated. A small key, B, permits the

operator to close the circuit and light the lamp at will. The elliptical reflector throws the light into the cavity of the ear, and illuminates it for the medical man's inspection.

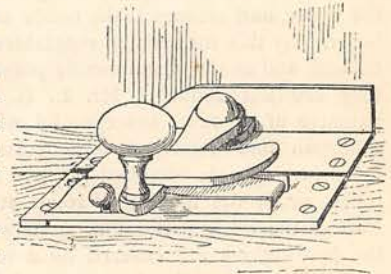
#### A Safe Window-Latch.

A window-fastener, which shall prevent a person opening it from the outside, is shown in our engravings,



OPEN.

both open and closed. The handle, on being turned so as to close the latch, passes over a flat spring, seen underneath, and when it is driven home the spring rises up and presses against the handle, thereby locking it, as shown in the lower figure. In order to release the handle and open the latch, it is necessary to press down the small knob at the side, as shown in the upper figure. This depresses the spring, and allows of the handle being at once turned backwards, so as to open the fastener.



CLOSED.

#### Cleansing Cisterns.

An association has been formed to undertake the important work of cleansing cisterns in London houses. However pure water is when it arrives in the cistern, if the latter be not kept clean, the water is soon contaminated. It has been shown by a recent report that many of these cisterns are foul, the sides being clothed with fungi, and the bottoms dirty with deposits dangerous to health. The charges for cleansing by the new association are moderate—namely, 2s. 6d. for one cistern of 250 gallons, 4s. for two cisterns, and 5s. for three cisterns of equal capacity in the same house. Yearly subscriptions insure periodical cleaning.

#### Dynamos and Danger.

Dynamo-electric machines giving what are called "high tension currents"—that is to say, currents of high electro-motive force, say 1,000 to 3,000 volts—are known to have proved fatal to persons receiving the shock through their bodies by touching the two poles of the machine, or bare wires connected to them, at the same instant. It is not easy to suggest a remedy for this state of things unless it be carefulness, combined with protection of the wires, or the disuse of such machines altogether, since they are not absolutely necessary to



electric lighting. M. d'Arsonval, a French electrician, points out, however, that most of the accidents which have occurred were due to the "extra current" set up at the moment of making or breaking the dynamo circuit, and not to the normal current itself. He also proposes to correct this evil by absorbing these extra currents into secondary batteries, or voltmeters, connected in series between the poles of the machine or across the two wires of the circuit. These voltmeters are made of small lead plates immersed in dilute sulphuric acid, and as many are taken as will give a counter electro-motive force equal or greater than that of the dynamo. Having a high resistance they do not "short circuit," or shunt aside the current; but at the moment of closing or opening the circuit of the dynamo they absorb the extra spark, thus guarding the engineer of the dynamo against the evil effects of a shock from it.



A New Reading-Stand.

A simple stand for bed or table reading is shown in the accompanying figure. The book rests on a base-board of solid wood, covered with Utrecht velvet, which prevents it from slipping, and is supported in an inclined position by a frame of wire, which folds down for convenience of carriage. A wire cord, with a weight to keep it in position, hangs down over the open pages, and keeps them apart by pressing on the margin. The right side of this cord, being light, is easily raised with the leaf on turning over a new page, and thus only one hand is required. The stand is also useful for holding music or for copying drawings.

#### A Whispering Machine.

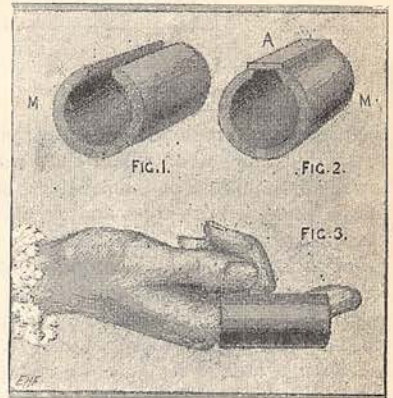
The idea of having automatic talkers is by no means novel, and has been familiar to us since the invention of the phonograph. Mr. Edison himself proposed to have electrotyped phonographic books, which, placed in a phonograph, would read aloud; and other ideas were promulgated at the time, notably one for casting phonographic or syllabic type which could be set up like ordinary type, and interpreted aloud by a phonographic machine. Some further attention has, however, been recently called to the idea, and its

probable efficacy in saving the eyes of students discussed. Whispering machines which might be placed close beside a person, for example in his hat, would be useful for private reading without disturbing others. For example, a man might take a walk along a busy street, and have the book of the season read to him. The invention would no doubt be useful if realised.

#### The Hypnoscope.

The "Hypnoscope" is a little apparatus for testing whether a person is liable to mesmeric influence, or hypnotism. It is the invention of Dr. Julian Ochorowicz, and consists, as shown in Fig. 1, of a tubular magnet, M, the edges of the slit being north and south poles respectively. Fig. 2 shows the magnet with its armature or "keeper," A, of soft iron, closing the poles to preserve the magnetism when the instrument is not in use. To use it, the armature is taken off and the forefinger thrust through the tube of the magnet, as shown in Fig. 3, so that both poles are united through the finger itself. At the end of two minutes the magnet is drawn off, and the person examined. According to Dr. Ochorowicz, about 30 per cent. of the persons examined in this way will be found to have experienced some peculiar objective or subjective sensations. Some 20 per cent. experience an itching or pricking of the finger, as if needle-points were entering the skin; others feel a sense of coldness, or of heat and dryness. A magnet placed under the feet of paralytics has been observed to warm them, although a good fire failed to do so. There is sometimes felt, also, an inflation of the skin, or a sense of weight in the finger, or a sense of attraction.

Persons in mesmeric sleep have also been observed to extend their hand to the magnet. The objective experiences are, on the whole, rarer, and consist of involuntary movements, complete insensibility or anaesthesia, paralysis of the finger, and contraction or rigidity of the muscles. These phenomena as a rule disappear under a slight massage or rubbing of the part. Persons in whom the hypnoscope produces these objective effects, may be hypnotised or "mesmerised" in a single séance.



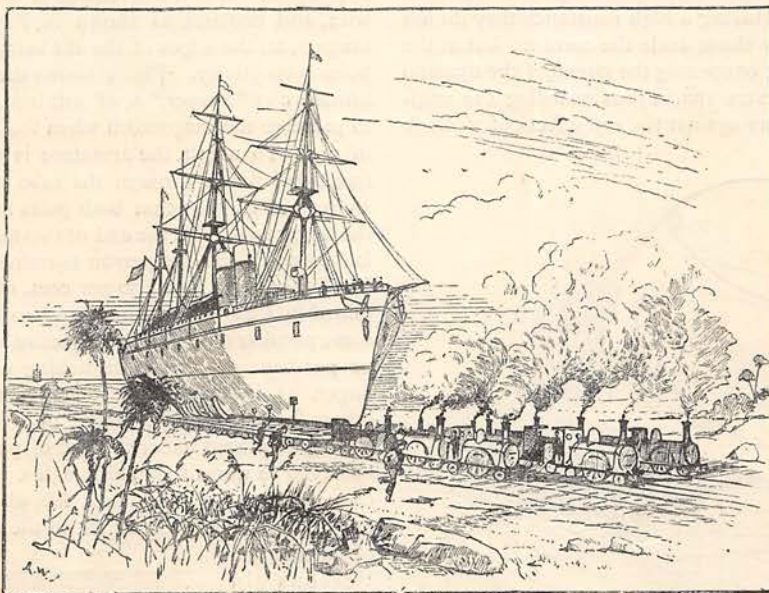
#### Conveying Ships by Rail.

It appears that communication between the Atlantic and Pacific Oceans will be obtained just as effectually, and with greater economy of time, by means of a ship railway constructed across the Isthmus of Tehuantepec in the south of Mexico, than by means



of the Panama Canal. Though the latter plan has the sanction of several eminent engineers, and has already made some progress towards completion, it has to contend with two drawbacks so serious as to constitute, in the opinion of certain competent authorities, fatal objections to its remunerative working, even if it were finished. In the first place, the district traversed by the canal is liable to be inundated every year by the mountain streams; and in the second place, sailing vessels—after passing through the canal—would find

security. As soon as the rails of the cradle come "flush" with the dry land rails, powerful locomotives draw it with its vessel burden along the nearly level railway across the isthmus. At the other end this process is reversed—the cradle being run on the pontoon and, when deep enough water has been reached, the ship released to float once more. The total length of the line between the two oceans will be about 134 miles. The surveys have been completed, and the undertaking is regarded as full of promise.



CONVEYING SHIPS BY RAIL.

themselves in a region where calms prevail almost incessantly, and out of which they would have to be towed for hundreds of miles before reaching the area of the trade winds—thus adding enormously to the cost of the voyage. The scheme for the Nicaraguan lifting-lock is open to the second objection, and to the further one that the adjoining coast is destitute of proper harbour accommodation. Clearly realising the force of these objections, Mr. James B. Eads conceived the brilliant idea of laying down a ship railway across the Isthmus of Tehuantepec. He obtained a concession for this scheme from the Mexican Government in 1881, and lost no time in giving it effect. The railway will be less costly to lay down than the other projects mentioned, and, as compared with the canal route, will shorten the journey between New York and San Francisco by 2,900 miles, between New Orleans and the same port by 3,500 miles, and between Liverpool and San Francisco by 600 miles. The plan of working the railway is simplicity itself. A huge cradle, the framework of which is furnished with a large number of wheels that rest upon a series of rails, is placed on a pontoon. The ship enters the cradle and is then raised out of the water by the pontoon, and, as it leaves the water, is shored up for greater

#### GAVOTTE COMPETITION.

*The Editor has pleasure in publishing the award of the judges in this Competition, the last of the series announced in the June (1884) number. Twenty-two competitors sent in Gavottes for Piano and Violin, and after careful consideration of all these MSS. the Prize of Three Guineas was awarded to*

W. W. PEARSON, Elmham, Dereham.

*Honourable Mention is awarded to the following competitors, in order of merit:—*

1. W. A. Cole, Lozells, Birmingham.
2. "Blanche Gore."
3. W. Claxton, Mus.B. Oxon., Tenbury.
4. Frank Barton, Bowness-on-Windermere.

*The Editor hopes to publish the successful competition in an early number of the Magazine.*

#### NEW PRIZE COMPETITIONS.

*Full particulars of a New Series of Prize Competitions, open to all readers of CASSELL'S MAGAZINE, will be announced in our next issue.*