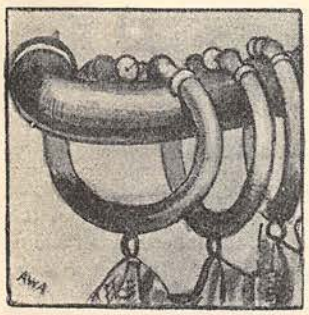
THE GATHERER.

An Easy-going Curtain-Ring.

A curtain-ring which catches and does not slide along easily is at least troublesome, and hence the ring of Mr. Rees, which we illustrate, may find some favour. It can be drawn round curves and angles as well as along a straight pole. The engraving shows the rings round a fore-shortened piece of the pole. The ring is cut away at that part which touches the pole, and between the two cut ends are inserted two little boxwood wheels mounted on a brass axle, and so constructed as to keep their positions on the pole. When the curtain is drawn the wheels roll on the pole, and the ring travels easily along.



Molten Lead in the Eye.

A jet of melted lead recently lodged in the eye of a French workman, without doing any injury to the organ ; and the case was investigated by Dr. Perrier, who ascertained that the immunity was due to the lead entering into the "spheroidal state" in presence of the moisture on the surface of the eyeball. The temperature of the lead was found to be higher than 171° Centigrade, which is the point at which the "spheroidal state" takes place, and hence the moisture was vapourised and formed a cushion round the lead, keeping the latter out of contact with the flesh. The phenomenon is a case similar to that of a person plunging his moist arm into melted lead with impunity.

A Straw-burning Engine.

In countries, or parts of a country, where coal or wood is scarce, it is sometimes necessary to burn straw or other vegetable trash ; and formerly the only way of doing so with the ordinary portable engine was to remove the grate and ash-pan, and place the fire-box over a bricked pit dug in the ground. In this pit the straw was burned, while the flames ascended into the fire-box above. This plan is, however, wasteful and inconvenient at the best, and portable engines for burning straw have been specially designed. The lower part of the fire-box is prolonged so as to form the furnace in which the straw is consumed. Instead of the ordinary fire-box, however, there is, in this new engine, a capacious chamber into which the flames from the grate enter and directly heat the boiler.

Fire-Fly Light.

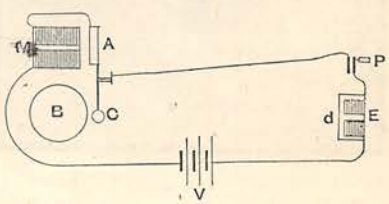
Two French experimenters have recently investigated the light emitted by the "pyrophore," or fire-fly, by means of the spectroscope. They find it to consist of red, yellow, green, and a little blue light. Green is the first colour to appear when the fly begins to emit light, and it is seen in the centre of the light-bearing organ. Only when the light is at its brightest does the rim or periphery of the organ emit light, and then the red light is noticed in the spectrum. With ordinary incandescence, on the contrary, the red rays are the first to appear as a body gets luminous. The fire-fly light is capable of rendering sulphide of calcium self-luminous, and it has very active photographic properties, as was proved by the experimenters taking photographs with it on five minutes' exposure, using gelatino-bromide plates.

A Rowing Machine.

There are, we believe, appliances of different kinds already in existence for enabling people to enjoy the exercise of rowing without either boat or water ; but such apparatus have usually been objected to because of their being stationary. But a rowing machine has now been devised by an ingenious American, on which the exercise is considered to be more agreeable. The apparatus provides for a continuous or endless track, with a boat or boat-shaped car on wheels, and supplied with oars. The act of rowing gives a forward movement to the "vessel," impelling it along with a certain degree of exhilarating impetus, which it is obviously impossible to obtain from the fixed machines above alluded to.

An Electric Bell Tell-Tale.

Sometimes an electric bell, or such-like indicator, gets out of order and fails to ring, no matter how well the button is pushed home. The person is not always able to hear whether the bell rings or not, especially it it be at some distance from him. To get over this inconvenience, Mr. K. Douglas Mackenzie has devised the plan we illustrate. In the figure, V is the battery working the bell M B, which consists of the electro-magnet M, and the bell or gong B, together with a soft iron armature A, and clapper C attached. In circuit with the bell, the battery, and the press-button P, is



another electro-magnet E, having a thin diaphragm of soft iron, *d*, over its poles. Now this electro-magnet acts like a telephone when the bell is ringing properly, for the intermittent currents, causing the bell to ring, make the electro-magnet E attract the diaphragm *d*,

and cause it to emit a musical note. As this sounding electro-magnet is placed near the press-button P, the person ringing the bell can hearken if the magnet sounds, and thus tell if the intermittent currents are flowing, that is, if the bell is acting. In order to make sure that the bell is ringing, the telephone, or sounding magnet, ought to be so constructed that it only emits a distinct sound when the current is strong enough to ring the bell; otherwise the latter might be interrupting a current which was too feeble to actually ring the bell, owing to a weakness of the battery power.

A Grenade Fire Extinctor.

A very quick and efficacious remedy for burning chimneys, or house fires that have not gained too general a hold, is furnished by the Harden "hand-grenade," which we illustrate herewith. It consists of a corrugated bottle of bluish glass containing a clear liquid, well corked up. The bottle is only a few inches in diameter, and is easily taken in the hand by grasping its neck. Thus held, it is simply dashed into the heart of the fire with a force sufficient to break the bottle and liberate the contents. These immediately give off large volumes of carbonic acid gas, which suffocate the fire in a remarkably short time—in fact, almost instantly. The writer saw one of these grenades extinguish, in a second or two, a mass of flaming tar and petroleum, which would have been a most alarming fire in a household. The gas is fatal to flames, and speedily extinguishes these; but flames

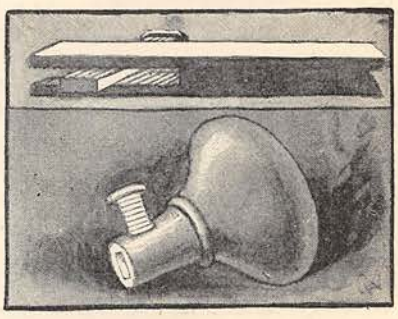
FIG. 1.

are the most dangerous part of an ordinary fire, and when these are put out the fire can generally be got under. Moreover, it is the flames which frighten people in a fire, since they are unruly and apt to catch the clothes or furniture. A few hand-grenades would therefore be useful articles to have about a house, provided the inhabitants, including servants, were taught where to find them and how to use them Fortunately, their use is as simple as throwing a stone or smashing a bottle, and there is nothing that can be called poisonous in their nature. It is best, however, to break them in the thickest of the flames, and continue firing them at the flames until these are totally extinguished. The grenade is, we understand, extensively used in New York and Chicago.

FIG. 2.

Useful Door-Knob.

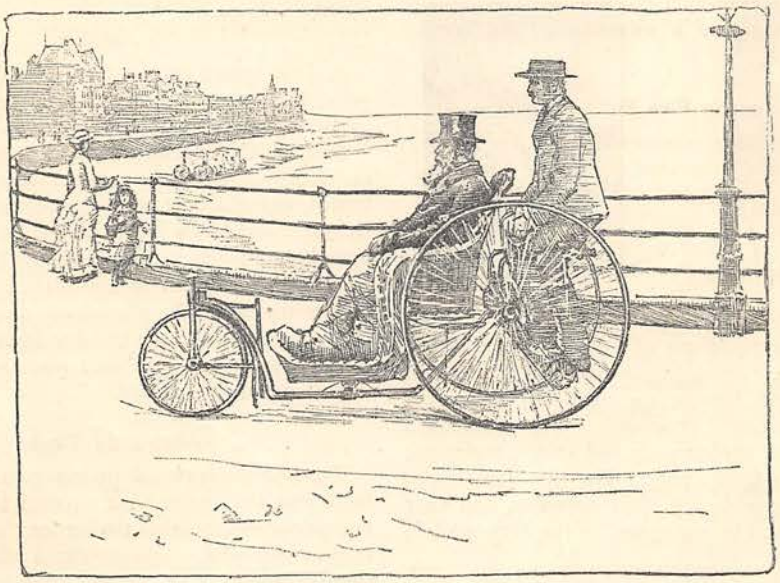
The accompanying woodcut represents the details of an improved form of door-knob. One end of the spindle has a longitudinal slit, the inner side of one of the prongs of which is furnished with serrations. The knob has the ordinary neck for receiving the end of the spindle, and also a vertical hole through which a flat key is inserted between the prongs. Upon one surface of the key there are serrations corresponding exactly with those on the prong, in order to compress the spindle and neck tightly together, so that all rattling shall be prevented. The end of the spindle can be pushed into the neck a greater or less distance according to the thickness of the door, and the knob can be firmly locked in its position by inserting the key as already explained. The lower figure represents the knob and key, and the upper the spindle and key, showing the mode of insertion of the latter. So many householders have been made acquainted by the "jerry builder" with the nuisance of door-knobs which will not bear the slightest wear-and-tear, that they will perhaps be glad to have this ingenious invention brought under their notice, though we cannot vouch for its satisfactorily working from actual experiment.



An Electric Piano-Lamp.

At the Health Exhibition there were several interesting examples of how the electric light can be adapted to domestic purposes. For instance, there was a piano-lamp for lighting music, which either projects from the front of the piano or leans over from above. The incandescent electric lamp has this advantage—it will burn in any position, even upside down, and it lends itself to the most delicate treatment. Over the lamp-bulb is a shade, mounted on trunnions in such a way that, whatever the position of the bracket, the eyes of the performer are shaded from the light, which,

however, streams over the music. An eye in the foot of the lamp-stand enables it to be hung from a hook in the wall over the music-stand when other instruments besides the piano are being used. A bed-room lamp on a telescopic stand, which can be drawn out and in, and used for reading in bed, was also shown. This telescopic form of holder lends itself to searching in drawers or cabinets for unseen articles. A ceiling-lamp, also shown, is provided with a spring drum, by which it can be readily raised or lowered at will. While upon this subject, we may mention that the practice of silvering the glass bulbs on one part is coming in more and more. A bulb silvered on one side is its own reflector, and may be placed against the wall without losing light, which otherwise would simply shine on the wall. Again, a bulb with its top silvered will throw down the light upon the space below. It may also be mentioned that bakers are adopting the incandescent light for lighting the interior of their ovens—a glass pane in the oven-door enabling them to ascertain how the bread is baking.



A TRICYCLE CHAIR.

A Tricycle Chair.

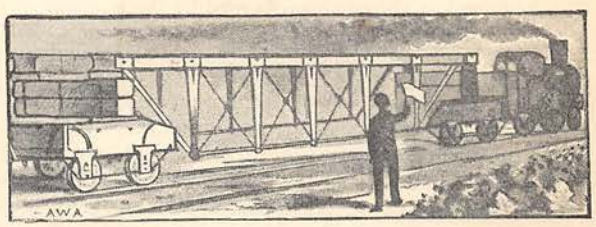
The ordinary Bath chair for invalids is a very "slow coach," and some invalids would enjoy a swifter transit. With a view of providing it, the chair tricycle which we illustrate has been introduced. It can be driven easily at the rate of five miles an hour. The wheels have india-rubber tyres, and the chair is mounted upon tricycle springs; hence the motion is easy and pleasant. The invalid sits in a wicker chair before and a little below the driver, who works the pedals and steers the machine behind him. In a recent trial at Coventry, an untrained workman propelled the new vehicle, with a sitter weighing nearly twelve stone, from Coventry to Birmingham and back, a distance of thirty-five miles, at the rate of eight to nine miles per hour.

An Illuminated Train.

The use of powerful electric arc lights upon the engines of railway trains as head-lights is more common in America than in Great Britain, and it is now proposed there to utilise these lamps in another way—namely, as back-lights, illuminating the train behind, and so arranged that a beam can be shed along the side of the train at which passengers alight on arriving at a station. This improvement, if successfully carried out, will tend to prevent passengers missing their foothold in stepping out at night.

Portable Railway Bridges.

In America are many adepts at transporting large constructions, and even railway bridges are now built and transported bodily to their intended site. Our illustration represents the mode of moving bridges on trucks which is adopted by Mr. C. Graham, engineer of the Boomsburg division of the Delaware,



Luckawana, and Western Railroad. Bridges can be moved on the railway any distance by it, at a rate of fifteen miles an hour. As will be seen, the ends of the

span rest on trucks which are drawn by locomotives. The bridge is lifted into position by cranes ; and thus much time is saved which would have been lost in building the bridge on the spot.

New Drip-Tiles.

Figs. 1 and 2 represent the use of new drip-tiles, which are designed to protect walls and parapets

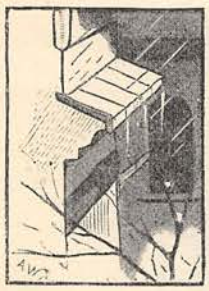


FIG. 1.

FIG. 2.

from the weathering effects of rain. Fig. 1 shows a tile adapted for cornices, and is made of terra-cotta. The rain runs off, leaving the moulding under the cornice clean and well preserved. Fig. 2 shows a commoner tile for garden walls and so on, protecting the mortar joints from decay. The tiles are said to cost less than the ordinary plain drip-tiles, and they have been approved by surveyors for the Metropolitan Board of Works.

The Heliograph in Mauritius.

An optical telegraph between the islands of Mauritius and Reunion, in the Indian Ocean, is in a fair way of being established permanently. Heliographic signals will be exchanged between the Pic Vert mountain in Reunion, and the Pouce mountain in Mauritius, so well known to readers of St. Pierre's "Paul and Virginia." Local telegraphs will carry the messages to Lacroix in the former island, and Port Louis in the latter. The communication is expected to be very useful to the trade and comfort of the islands, by announcing cyclones on their way ; and it was found that a submarine telegraph would cost too much to be adopted at present.

Paper from Sugar-Cane Refuse.

Paper is now made from bagesse, the refuse of the sugar-cane after the juice has been squeezed out. This bagesse has hitherto been burned by the planters as worthless.

Electric Power for Paris.

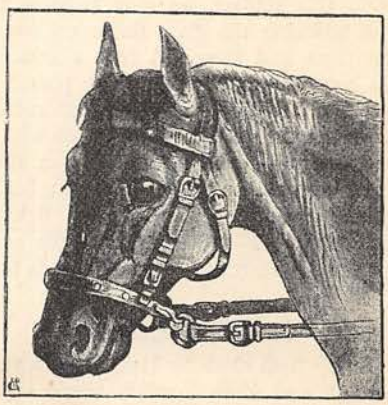
M. Marcel Deprez has lately been arranging to transmit from 100 to 150 horse-power of energy from Creil to the workshops of the Gare du Nord, Paris, to be utilised either for producing electric light, pumping, or working machinery. As about 50 per cent. (one-half) of the power will be lost in transmission, he will require from 200 to 300 horse-power at Creil ; but this is provided gratis by water-power there, so that the power utilised only costs the interest on the prime cost of the appliances and the annual cost of maintenance. The apparatus will consist of two powerful dynamos, connected by the conductor from Creil to Paris. The latter will be 5 millimetres in diameter, and consist of copper wire. Turbines at Creil will transform the water-power into mechanical rotation, and drive the generating dynamo, which will transmit the energy in the form of an electric current to the other dynamo at Paris, which in turn will reproduce it as mechanical power.

Apatite.

A little-known mineral of considerable economic value formed the subject of a paper read before the Montreal meeting of the British Association. Apatite is found in Canada, and 22,000 tons of it were exported in 1882. It is also found in some of the United States, especially in Massachusetts, New Jersey, and Crown Point, New York, but there it is associated with iron-ore and is found useless as a fertiliser, the purpose to which it is applied. Its fertilising properties are due to the phosphoric acid and phosphate of lime it contains ; but the development of the South Carolina phosphate and marl trade has diminished its importance in this regard.

Australian Timber.

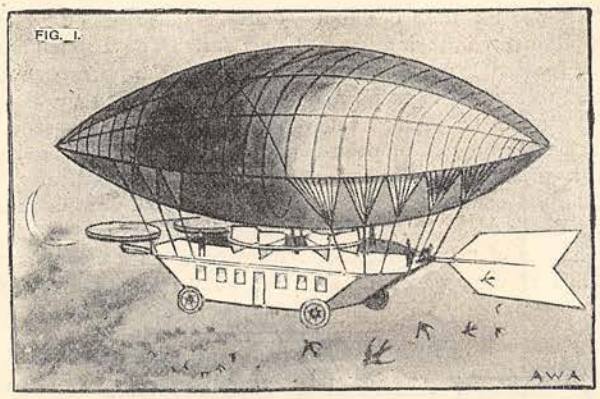
The Board appointed to inquire into the best uses for Australian timber have reported that "blackwood" is superior to any other timber for the construction of railway carriages. The mountain ash comes next. It should be felled in winter, after it has attained a diameter of from four to five feet. Blue-gum should, the Board think, be treated in the same manner. It is expected that a large trade in Australian timber will yet spring up between England and the colony.

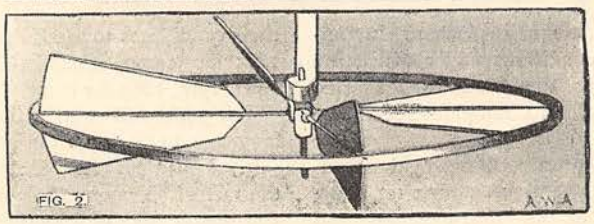


A Steel Nose-Band for Horses.

The iron "bit" for horses is so old-established that it seems one of those terminal forms of invention which cannot be improved upon. Nevertheless, there has been brought out a substitute, which we illustrate herewith. This is called the "Carrago" nose-band, and is designed to control the most unmanageable horse by pressure of the band on the nose and cheek-bones, which form a very sensitive

part of the head. The band is of steel, and is attached to the bottom of the bridle, as shown, so that it presses on the nose at a point about two inches below the place where the nose-bone separates from the skull proper, and passes just above the mouth. Pressure is exerted by both reins, but only when the animal is not going quietly. The band can be used to guide him in a gentle manner, and a pad protects the nose from chafing. Its weight is only some eight ounces, which is carried by the nose-bone; hence it is no burden whatever to the animal.





An Aerial Propeller.

The recent essays in ballooning have given a special interest to apparatus designed for propelling these aërial vessels, and our figures illustrate a device patented in America by Mr. M. H. Dupue. Fig. 1 shows the cigar-shaped balloon with car and propeller attached in the act of atmospheric flight. Fig. 2 shows the general appearance of the propeller, which has a rim and hub in which radial blades are fixed, very similar to the spokes of a wheel. The main rudder for steering the balloon is shaped like the feather of an arrow or wind-vane, as shown in Fig. 1, and projects behind the vessel, whereas the propeller is mounted in front of it; but there is another rudder fixed to the side of the car, which is used to raise and lower the balloon at will. On descending to earth, the car rests on wheels, which are meant to avoid any scraping on the ground.

Heliographic Paper.

Heliographic paper has been designed for the purpose of enabling draughtsmen and others to make copies of drawings without tracing them, and by the action of sunlight on chemicals in the paper. To make the copy, cut off a piece of heliographic paper rather larger than the drawing to be copied. The latter should be in the form of a tracing on translucent paper or cloth. It should be placed face downwards on a glass plate, or what is known as a copying frame, and lay the prepared paper over it, taking care to have the surfaces of the two papers in contact throughout, and no crease or fold anywhere. A piece of thick cloth or felt covering on the back of both, helps to equalise the pressure and bring this condition about. The frame and paper must then be exposed to direct sunlight from ten to twenty minutes in fair weather, in dull weather from thirty minutes to an hour. The light passes through the tracing paper except at those places where the black lines of the drawing run, and acts on the chemicals in the prepared paper behind, producing blue lines opposite the black lines of the original. When the *fine* lines of the original appear blue on the copy, the exposure has been long enough; if they appear yellow, the exposure must be continued. The copy is then taken out of the frame and forthwith immersed in cold or tepid water until the lines become white, which will take place in about ten mintues' time. The copy then shows as white lines upon a blue ground.

Some Novel Christmas and New Year's Cards.

A new mode of frosting Christmas cards by machinery has recently been introduced by Messrs. Wirths Brothers and Owen, of New York, who now appear for the first time in the English market. This machine process not only preserves the health of the workers, which was frequently injured by the old method of frosting by hand, but also secures greater durability of the frosting. The designs issued by this firm are all of a seasonable character, and with their glistening imitations of frosted snow are very tasteful in appearance. Some satin sachets, and satin-covered books of designs, are also very beautiful. It would be impossible to do anything like justice to Messrs. Raphael Tuck and Sons' magnificent assortment of cards in the small space at our command. They have managed to produce a variety from which every conceivable taste may select with ease. Messrs. Marcus Ward and Co. send us some very pretty portfolios of sketches —on the water and in the hunting-field—by Mr. H. C. S. Wright and Miss Georgiana S. Bowers. A happy idea, too, was that which led to the printing of Miss F. R. Havergal's "Bells across the Snow," with a view of Linton Church, Herefordshire, the sound of whose bells suggested the lines. A quaint effect is produced by some cards folded so as to represent envelopes, which, when opened, display beautiful bunches of flowers, apparently thrust haphazard into the envelope, for stray petals and leaves peep out

at the edges in a very natural manner. But one of the cleverest designs issued by this firm represents some half-dozen donkeys, whose long-drawn shadows, cast by the setting sun, trace on the grass the motto, "A merry Xmas." Messrs. Hildesheimer and Faulkener's cards are remarkable for their beautiful colour-printing, and for the originality in their designs. Two beautiful cards, bearing seasonable mottoes, form the covers of a little booklet containing eight poems by Robert Burns, which is sure to be popular with our Scotch friends; and a similar booklet of poems upon "Home" will form a pleasant memento for any friend who has left the old country for a new land. A series of four cards, designed by Mr. F. Noel Paton, have verses by the author of "John Halifax, Gentleman;" and Miss Alice Havers, whose drawings in our own pages have been a great attraction to our readers, contributes some beautiful designs. But perhaps the most charming cards issued by Messrs. Hildesheimer and Faulkener are the screens, some of which, with their rich dark colours on the one side, and delicate landscapes on the other, are most artistic productions. The London Stereoscopic Co.'s novelties are, as might be expected, mostly photographic in character, but they are also remarkable for the originality of their mottoes, especially one inscribed, "Who sent it?" Some coloured photographs of wreaths of flowers—one in particular, encircling the picture of a laughing child, and another with a "Sea-scape" for centre-piece—and a set of floral designs painted by hand upon black mounts, are very beautifully finished. and will no doubt be very popular.

CASSELL'S MAGAZINE AMATEUR SHORTHAND CHAMPIONSHIP.

THE Editor has much pleasure in announcing the conditions under which the competition for the Cassell's Magazine Amateur Shorthand Championship will be conducted.

The Competition will be held simultaneously in all centres on June 1st, 1885, at eight o'clock in the evening, and attached to the Championship will be a Prize of Five Guineas (if won by a competitor in the United States, 25 Dollars). The Competition will be conducted by means of printed papers to be supplied by the Editor, and read aloud in the presence of the competitors, who will be required to write them from dictation in the system of shorthand known as Pitman's Phonography.

In order to bring the Competition within reach of all readers of the Magazine, intending competitors may form local centres in their own neighbourhood, the only condition being that at least three householders, one of whom must be a magistrate or minister of religion, signify to the Editor, in writing, their willingness to act as Honorary Local Managers. The form in which they should do this is as follows.*

To the Editor of Cassell's Magazine.

We, the undersigned, wishing to bring the opportunity of competing for the Amateur Shorthand Championship within the reach of the residents in our neighbourhood, hereby signify our readiness to act as Local Managers of the Competition, to give our services gratuitously, and to be responsible for any expenses incurred in connection with the holding of the Competition in this centre. We also undertake that at least two of us shall be present during the whole of the time appointed for the Competition, and that one of us will read the passages at the specified rates, and also that we will see that all the regulations of the Competition are strictly adhered to. We request that all communications in reference to this matter be addressed to Mr. , who will act as our Honorary Secretary.

(*Signed*)

The above form, signed by not less than three householders, must be sent to the Editor not later than April 30th, 1885 for centres in the United Kingdom, and not later than March 31st, 1885 for centres abroad. The Local Managers will be required to send the names of their candidates to the Editor not later than May 15th, 1885 for competitions in the United Kingdom, and April 15th, 1885 for competitions abroad.

The paper will contain three passages in the English language, to be written in phonography on ruled paper—(i.) A business letter of about 200 words, to be read at the rate of 50 words a minute; (ii.) a passage of about 500 words from a scientific work, to be read at the rate of 75 words a minute; (iii.) a passage of about 750 words from a newspaper, to be read at the rate of 130 words a minute. Competitors will also be required to transcribe and punctuate one of the two last passages. One hour will be allowed in which to work the whole paper. The following are the detailed regulations:—

1. The Competition is open to all readers of the Magazine who are not professional reporters or shorthand teachers.

2. The Local Managers are to be responsible for all expenses incurred in their centre, and for the fair conduct of the Competition in accordance with the regulations. The competitors may be required by the Local Managers to contribute to the local expenses (if any) by paying a small local fee to the Local Managers for such purpose only. No fee is required at headquarters from any candidate.

3. The passages to be read will be sent to the Secretaries of the Local Managers, under cover, one week before the date fixed for the Competition, and the envelope shall be opened in the presence of the competitors at the appointed time.

4. No communication shall be allowed between the competitors in the examination room, and they shall be seated at least three feet apart, shall observe strict silence, write in black ink, and shall make no corrections in the shorthand after one minute has elapsed from the conclusion of the dictation of the passage. Each competitor shall attach his name and full postal address to his paper, and shall also make a declaration upon it that he is not a professional reporter or shorthand teacher, and this declaration shall be attested by one of the Local Managers.

5. The papers shall be collected by the Local Managers at the expiration of the appointed time, and enclosed in an envelope for transmission to the Editor. This envelope shall also contain a declaration signed by at least two of the Local Managers that the Competition has been conducted in accordance with the regulations.

6. The decision of the judge appointed by the Editor must be regarded as absolutely final. The prize may be withheld in the event of the judge not considering any paper worthy of the distinction. Honourable mention may be awarded to such other competitors as shall have distinguished themselves in the Competition.

7. All communications must be addressed to the Editor of Cassell's Magazine, La Belle Sauvage Yard, Ludgate Hill, London, E.C.; and if an answer is required, a stamped and addressed envelope must be enclosed. In the case of an application from the Secretary of a local centre for the printed papers, a stamped envelope should also be enclosed.

* Printed copies may be obtained for this purpose on application to the Editor.