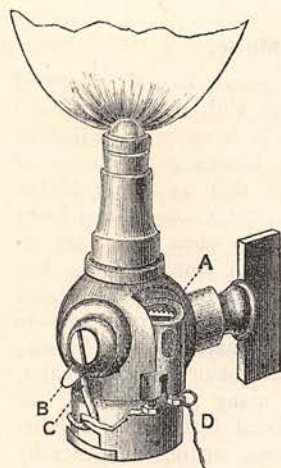


## THE GATHERER.

**A Self-Lighting Gas-Burner.**

To save the trouble of applying a lighted match or paper slip to a gas-jet, an ingenious Frenchman,



M. Loiseau, has devised the arrangement shown in the accompanying figure. It consists of the ordinary gas-burner fitted with a special device, which on turning the stop-cock completes the circuit of an electric battery, thereby heating to a glow a fine platinum wire, and at the same time allowing a small jet of gas to escape against the wire so as to ignite it. The wire is shown at A, and the circuit is completed by the projecting lug, B, coming into contact with the piece, C.

This latter piece is connected to the wire, D, running to the positive pole of the battery, and B is connected to the gas-pipe and the negative pole of the battery. The ignited jet of gas springs up and kindles the larger jet above; and on turning the stop-cock still further the battery circuit is broken, and the kindling jet cut off. While upon this subject, we may mention that Mr. W. Lascelles Scott has succeeded in increasing the illuminating power of gas-flame, by introducing solid substances into it. He arranges the burner at an angle, and allows the dust of certain alkaline earths to fall through it. Thus with a powder of mixed lime and magnesia the illuminating power of a jet rose from 16.7 candles to 18.2. Again, with an Argand burner giving 62.4 candles the light was raised to 68.5 candles.

**New Telegraphs.**

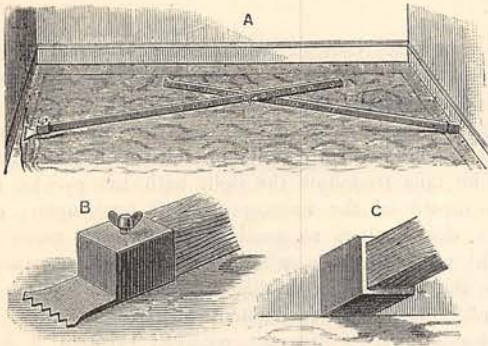
The great power of the modern telescope has suggested a simple telegraph for short distances, which has been tried with success at the Palace of the Trocadéro, Paris. It consists in reading large letters of silvered zinc by means of a powerful refracting telescope. The letters are exposed at the distant station on a blackened board, and by means of their bright surface can be seen a long way off. Letters a yard square, exhibited at the Panthéon, have been readily distinguished at the Trocadéro, a distance of three miles. Another new telegraph, for use on submarine cables, is also worthy of mention. It is the invention of M. Samuel, of Ghent, and consists in making the ordinary mirror galvanometer record its message in permanent characters. At present the

galvanometer indicates the message by reflecting a ray of lamp-light from its moving mirror on a paper scale or screen, and the telegraph clerk spells out the letters of the message from the wanderings of the reflected ray to right or left upon the screen. If he fails to follow the light with his eye he has no record of the message to fall back upon; and this drawback is so great that enormous sums are paid yearly by the submarine telegraph companies for the use of Sir William Thomson's siphon recorder, the only instrument hitherto invented for writing down a message received through a long cable. M. Samuel, however, has produced an instrument which may to a certain extent rival the siphon recorder. He fixes two selenium cells, such as Professor Bell uses in his photophone, to the screen or scale on which the reflected ray of the galvanometer falls, and each of these cells is in connection with a voltaic battery and an electro-magnet. Now, selenium has the peculiar property of diminishing in its resistance to the passage of electricity when light falls upon it, so that when the wandering spot of light on the screen passes over the surface of a selenium cell, the resistance of the latter decreases, and a stronger current from the voltaic battery traverses the electro-magnet. The result is that the magnet attracts an iron armature, which in turn presses a metal stylus against a band of paper moistened with iodide of potash, and the point of the stylus leaves a mark upon the paper. Thus, whenever the reflected spot of light falls upon the selenium cell, a mark is made upon the prepared paper; and as there are two cells on the screen, one to the right and the other to the left, a signal will be marked when the light-spot moves to the right and left of the screen. These two signals correspond to the "dot" and "dash" characters of the Morse telegraphic code, and are read accordingly by the clerk.

**New Carpet Stretcher.**

The accompanying woodcut represents a useful form of carpet stretcher, A, recently patented in the United States. It consists, as will be seen, of two bars of wood perforated at regular intervals throughout one half of their length, and pivoted by a "wing nut," by which the two bars may be fastened together into one rod. The stretcher may be lengthened or shortened to suit the size of the room, and one end of it is furnished with a toothed plate for "catching" the carpet, B, while the other is provided with a cushion, C, for placing against the side-board of the wall opposite that towards which the carpet is being stretched. Its operation is obvious: the cushion being laid against the panel, and the toothed plate inserted in the carpet near the edge to be pushed to the wall, all that is needed is to depress the bars until they are parallel, or until they have reached as

low an angle (when they will have to be bolted) as the laying of the carpet will allow. In this way the



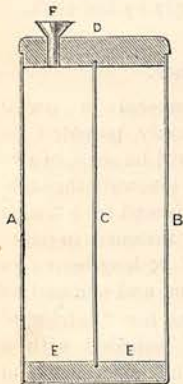
carpet will be stretched throughout the entire width, and not much exertion is required to press down the bars. But would not iron be a more suitable material for the bars than wood?

#### A Remedy for Asthma.

The newspapers in Queensland and New South Wales have lately spoken very highly of a new remedy for asthmatic and bronchial affections, in the shape of a species of *Euphorbia* indigenous to Queensland, and known scientifically as *Euphorbia pilulifera*. It is said that an ounce of the leaves of the plant placed in two quarts of water, and allowed to simmer till the quantity is reduced to one-half, will afford a medicine which, taken a wine-glassful at a time, two or three times a day, will relieve the most obstinate cases of asthma, as well as ordinary coughs. The leaves of the plant are readily gathered and dried, and will keep for a considerable time.

#### A New Electric Magazine.

Accumulators for storing up electricity are just now the chief desideratum in electrical research, in order that electricity may be the better adapted for the electric lighting of vehicles and other movable objects. A new electric magazine of this kind has been invented by Mr. Henry Sutton. It consists of a flat copper case, A B, shaped like the outer vessel of a Grove battery, and covered with a lid of paraffined wood, D. From the bottom of this lid depends a plate of lead, C, amalgamated with mercury, the lower and upper edges of the plate being held by grooves cut in the under side of the lid, and the upper side of a block



of wood, E E, resting on the bottom of the cell. A vent-hole, F, in the lid allows of a solution of sulphate of copper being poured into the cell. The power of the cell is improved by adding  $\frac{1}{2}$  of sulphuric acid to the copper solution. The amalgamated lead plate

forms the positive pole of the cell, and the copper vessel the negative pole. When charged by the current from a dynamo-electric machine, the sulphate of copper is decomposed, and pure copper is deposited. When the charging current is cut off, the reverse action sets in on connecting the poles of the cell—the deposited copper is recomposed again into sulphate, and a reverse current to the charging one flows in the circuit.

#### Colour-Music.

It is known that certain people have the power of associating different colours with different musical notes, and the subject has been recently studied by two Swiss *savants*, Herren Bleuler and Lehman, of Zurich. Their results show that, as a rule, higher notes are accompanied by lighter colours, and lower notes by darker ones. Chords when struck are attended by corresponding colour combinations. For example, a skilled musician who was examined stated that he perceived a distinct colour with each key—to wit, for C major, grey; G flat major, reddish-brown; A major, blue; A minor, lead-colour; F sharp major, yellow; and so on. To many persons, too, the same piece played by different instruments appears in different colours. Noises, again, are generally accompanied by colours of a grey or brown hue. The authors also found that some minds perceive colours on hearing consonants, vowels, diphthongs, words, and sentences. Others perceive sounds on seeing light and colours, so that the reverse phenomenon also exists. Thus a broad, quiet gas-flame suggested the sound *we*, and when the light flickered the sound changed to *l*. The faculty is said to be in a high degree hereditary.

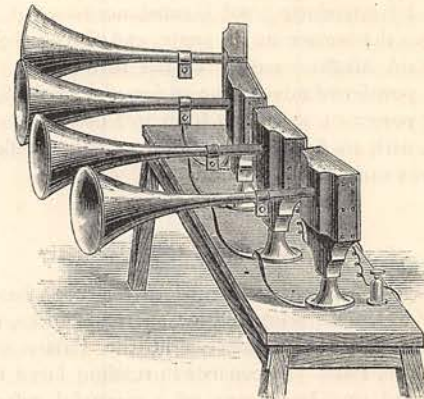


FIG. 1.

#### The Telephonic Horn.

At the recent Paris Electrical Exhibition, much interest was excited amongst the curious by an apparatus called the "Fanfare Ader," which consisted of four horns or trumpets arranged on a table as shown in Fig. 1, and emitting blasts of sound which were more remarkable for their vigour than their beauty. These trumpets were sounded by electricity,

and represented the receiver of a telephonic circuit running from the Exhibition building to the adjoining Alcazar Theatre in the Champs Elysées, where the transmitter was placed. The latter consisted of four Reiss telephones, in which the air-waves beating on a parchment diaphragm open and close an electric circuit by means of a platinum contact-piece gummed to the parchment. The result was a series of rapidly intermittent currents of electricity from the battery in circuit with the transmitter and the wire. These currents traversed the wire and passed through the receiver, which consisted of four devices similar to that shown in Fig. 2, where A B is a horse-shoe magnet having two coils of wire, E E', on its poles. From these poles project two pieces of soft iron brought very close together, and in front of them, as will be best seen from the section in the upper part of Fig. 2, there was placed a small

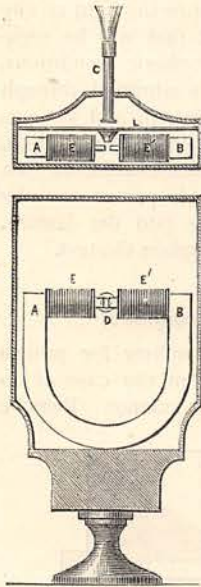


FIG. 2.

piece of soft iron, D, glued to the back of a thin sounding-plate or diaphragm, L, of pine board. Now, when the intermittent currents passed through the coils, E E', on the poles of the magnet, the piece of soft iron was attracted and released, and thus the diaphragm was set into powerful vibration. A trumpet pipe, C, led into the resonant chamber behind the diaphragm therefore gave out lusty sounds. In this way the blasts of four cornet-players in the Alcazar Theatre were loudly reproduced in the Palais de l'Industrie, but the quality of the music was sacrificed. M. Alder has also attempted to reproduce speech by this device, but unsuccessfully. This failure might have been expected, for the actual interruption of the circuit by the Reiss transmitter renders it impossible to transmit the delicate modulations of the voice.

#### A New Door-Fastener.

As a rule, one who has had much experience of new contrivances for getting rid of the ordinary means of opening and closing doors, is apt to fight shy of novelties in this field of invention. But a door-fastener and lock recently patented seems to be decidedly an excellent appliance. Its *modus operandi* is exceedingly simple. A door supplied with this fastener is opened from the inside by drawing towards the person the little handle or knob, or from the outside by pushing it slightly away from the person. This action may be explained in a few words. The knob, being pulled inwards, actuates a small brass rod and powerful spring, that acts as a lever and releases the bolt, which being provided with revolving ends, moves with the utmost ease. By employing this

contrivance, the unsightly lock fastened upon the door is not needed, since the appliance is inserted in the door after chiselling out a hole for it. Nor is the comparatively huge handle at present in vogue, and which so often goes wrong, required; and the turning nuisance is, therefore, abolished. In cases where the wood-work has shrunk or warped, security is obtained by the use of adjustable striking-plates. The mechanism is singularly simple and, so far as we can see, there is no reason why these patent door-fasteners should not, as is in fact claimed for them, last a lifetime.

#### Fires in Public Buildings.

For diminishing the danger of conflagration in public buildings, Signor G. A. Martini recommends the following formulæ for rendering materials non-inflammable in the following three cases:—

##### 1. For light tissues such as dresses, &c.

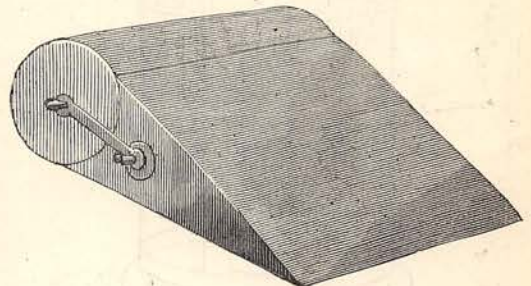
Pure sulphate of ammonia	...	8 parts.
„ carbonate of „	...	2½ „
Boracic acid	...	3 „
Starch, dextrine, or gelatine	...	2 „
Water	...	100 „

##### 2. For timber work, &c.; to be applied with a brush (like paint) at a temperature of 140° Fahr.

Hydrochlorate of ammonia	...	15 parts.
Boracic acid	...	5 „
Glue	...	50 „
Gelatine	...	1 „
Water	...	100 „

##### 3. For cloths, ropes, straw, &c., which should be immersed for about fifteen or twenty minutes at a temperature of 212° Fahr. and allowed to dry.

Hydrochlorate of ammonia	...	15 parts.
Boracic acid	...	6 „
Borax	...	3 „
Water	...	100 „



A Pocket Pillow.

The illustration represents a portable head-rest for travellers which is likely to prove useful. It consists in a cylindrical tube provided with an air-tight cap. The tube fits into the hollow of a wedge-shaped rest or abutment which can be placed on the seat of a railway car, or the floor of a room. Both parts are made of flexible material, and the air-pipes at the

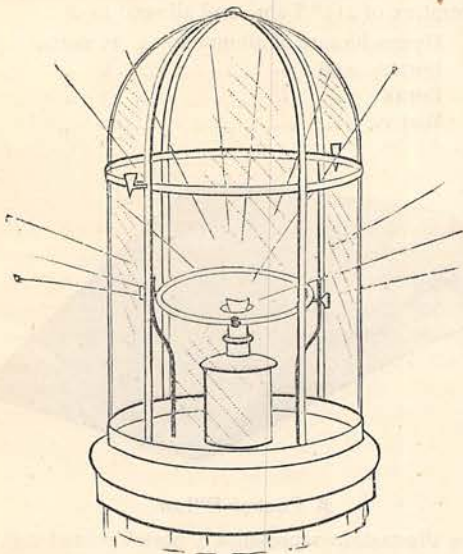
sides admit of their being inflated by the mouth at will, while a link couples them together. When not in use the air is expelled, and the pillow folded up for carriage in the pocket.

#### Oil on the Waves.

It is well known that the ancient metaphor about "pouring oil on troubled waters" to calm them is literally true; and ships at sea have been saved from foundering by pouring barrels of oil upon the waves around. A striking experiment of the kind was recently made at Peterhead in Scotland, in order to allow a fleet of fishing-boats to enter the stormy harbour with their cargoes. By means of a reservoir and pipes leading to the harbour, a stream of oil was discharged upon the water, and spreading in a thin film over its surface, reduced the rough waves to a mere swell, and permitted the boats to land. The chief action of the oil is probably to diminish the friction between the wind and water, and thus prevent the formation of waves, while the existing motion of the water quickly subsides into a low heaving. Probably the experiment, after the success at Peterhead, will be repeated elsewhere.

#### A New Lighthouse Lantern.

An American inventor has conceived the notion of constructing a lighthouse lantern which should illuminate by throwing the light upwards against the clouds (by which it would be scattered over a wider area) instead of by diffusing it horizontally, in consequence of his having observed, fifty miles from his home, the lights of New York reflected from the clouds. The tower of

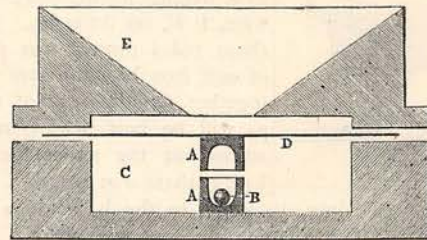


the lighthouse is constructed in the usual way, and supports the lantern, the sides of which are of glass secured to a frame fastened to the top of the tower. The lamp chamber is arched in the form of a dome, in one piece or in sections, according to special require-

ments. The reflector is a circular concave disc, with a hole in the centre through which the flame of the lamp projects. The reflector is placed in a gimbal furnished with clamping screw pivots to enable the reflector to be adjusted so as to throw the light at any desired inclination, an adjustment that will be regulated in accordance with atmospheric conditions. The air to support combustion is admitted through apertures in the bottom of the lantern, and the gas escapes from the lantern by means of "elbow" pipes, the lower arms of which incline downwards, so that rain falling into the open upper ends passes away by these outlets, instead of pouring into the lantern. The accompanying woodcut will explain the text.

#### The Cup-and-Ball Microphone.

A very good microphone transmitter for private telephone lines can be made from the case of an ordinary telephone in the following manner. Remove



the coil and magnet from the case, and plug up the hole in the latter left by the withdrawal of the magnet, so as to get a wooden box similar to that shown in the figure, where D is the iron diaphragm, and C the resonance chamber, and E the mouthpiece, which is not shown firmly screwed down upon the diaphragm as it ought to be when utilised. At the back of the diaphragm, D, is glued a carbon cup, A, made by drilling out a hole in a piece of carbon rod with a bradawl. Opposite this, and secured to the bottom of the case by a lead rivet, is a similar cup of carbon, A. In this latter cup is placed a pellet or pea of carbon, B, made by turning a little ball on the end of a  $\frac{3}{16}$  inch carbon rod. The interior of the cups and sides of the ball should be ubbed smooth with emery paper. The carbon cups are both connected by wires to terminals fixed into the case, but not shown in the figure. These terminals are then connected in circuit with the battery and the receiving telephone. To make this cup-and-ball transmitter speak well, it should be mounted on pivots like a looking-glass, and slightly inclined backward or forward until distinct speech is received in the telephone. This best position can then be retained until a new one becomes necessary.

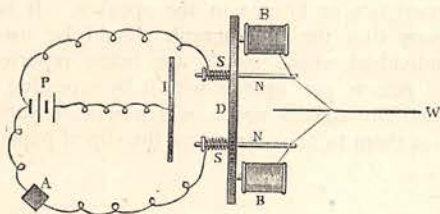
#### Hospital Trains.

The enormous amount of suffering ameliorated by the use of hospital trains having carriages fitted up as beds and provided with ventilators, coolers, and disinfectants, has already been proved by trials made

during the Franco-Prussian and the recent Russo-Turkish war. But it is clear that no government can go to the expense of providing enough of these trains to meet the requirements of a great battle, and it is therefore important to have some ready means of transforming ordinary railway carriages into hospital ones. At the recent Milan Exhibition, the Società Veneta exhibited two such cars, one a first and second class, the other a third. Both are 50 feet long, and built on the American plan, though the first-class carriage is divided into compartments. They run on bogie trucks and the brake is very continuous and powerful. The carriages are united by wide platforms which can be temporarily covered in by screens. The third-class carriage, when its seats are removed, accommodates eighteen patients on movable litters placed along the sides in two rows, one above the other. In the mixed carriages the first-class compartments are converted into bed-rooms for the officials or attendants, and the second-class into dispensary, kitchen, or dining-room, according to circumstances. The model train of the Società Veneta would consist of 30 vehicles, including 20 ambulances, 6 office carriages, and 4 baggage waggons. It would accommodate 360 patients and 37 officials of all grades.

#### The Honey-bearing Ant.

The researches of the Rev. H. C. McCook, D.D., in New Mexico have brought to light another peculiarity of ant-life—we had almost said ant-civilisation. Amongst the honey-ants of New Mexico there are three castes of working ants who gather honey from a species of vegetable gall in the night time; but instead of storing it in combs, they pour it into the crops of another caste of ants belonging to the colony. These are the honey-bearers, and their function is simply to store the honey until it is wanted by the other members of the community. For this purpose their crops are abnormally developed, and it requires about 1,000 "rotunds," as they are called, to yield a troy pound of honey. When the other ants require food they go to the rotunds, who feed them by pressing out a drop of honey from their interiors. This honey is pleasant to the taste, like ordinary honey, but is more aromatic, and diluted. It is nearly a pure solution of grape-sugar.



#### Electricity and Wire-Covering.

In covering wires of iron and copper with silk or cotton for electrical and other purposes, it is of course

necessary to guard against the breakage of the fibres; and Signor Sarvalle, an Italian inventor, has devised a plan whereby an electric bell is rung whenever a break occurs. This device, as sketched in the figure, consists in mounting the bobbins of thread, B B, on an ebonite disc, D, which in revolving lays the thread on the wire, W. This disc is penetrated by a series of brass rods or needles, there being as many needles as there are bobbins. For the sake of simplicity only two of these, N N, are shown in the figure. Each thread passes through the eye of one of these needles on its way to the wire, and the tension of the thread pulls on the needle-eye. The needles are prevented from being drawn out of the disc, however, by spiral springs, S S, on their other ends behind the disc. Opposite these ends is fixed an insulated metal disc, I, connected to one pole of a battery, P, whilst the other pole is connected to all the needles. Now, when a thread is running freely the tug of it upon the eye of its needle prevents the point of that needle touching the metal disc behind; but when that thread breaks the spring pushes the needle back into contact with the metal disc behind, and the circuit being completed the current rings an alarm bell, A. This contrivance is similar to those in use for telling the rupture of a thread in reeling yarns, and is worthy the attention of manufacturers.

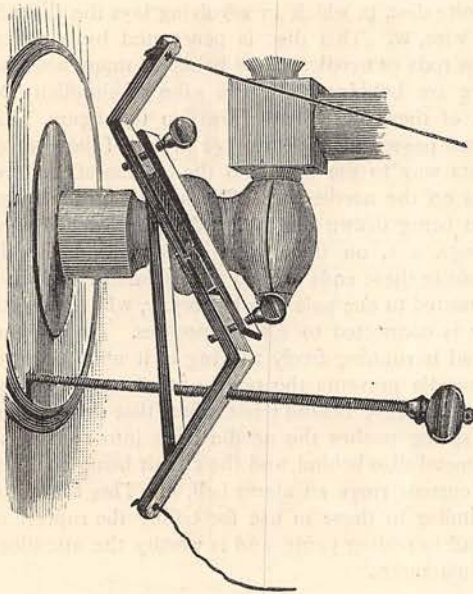
#### A Giant Photograph.

Without doubt the largest photograph in existence is now being exhibited in the art gallery of the American Institute at New York. It covers an area of ten feet in length by eighteen inches in width, and was printed from seven different negatives forming the parts, but these have been so deftly joined that the picture seems to have been taken in one view. The subject is a panorama of the Centennial Exhibition at Philadelphia in 1876, and the work is by Mr. F. Gutekunst, of that city. Duplicates of the picture are selling at high prices, and one has been presented to Her Majesty the Queen. In this connection we may note that an improved means of exhibiting photographs on a screen as dissolving views, or simple pictures, has been introduced by Mr. W. C. Hughes, of Hoxton, under the somewhat odd name of the "Pamphengos." The chief novelty consists in adding power to the light of the projecting lantern by the use of four wicks, giving a flame eight inches wide, but the lenses and other parts are also improved. With this apparatus a well-defined photographic image twelve feet in diameter can be obtained on the screen.

#### A Gas-Light Regulator.

A simple and ingenious device for regulating the light from a gas-burner is shown in the accompanying engraving. The appliance—which is the invention of Mr. T. G. Sharpe—is intended primarily for use in connection with brackets, and it will be found to be most generally employed in bed-rooms, though no doubt it could be adapted to almost any form of gaselier. The gas having been lighted, the tap must

be turned so that the end which lowers the light shall move towards the wall. The regulator has then to be fitted upon the tap and screwed down, so as to be retained perfectly secure. The regulating screw at



one end of the appliance being placed in position with the point towards the wall, it is next turned so that when it touches the bracket-plate on the wall the light is at its lowest. The ends of a piece of stout string, long enough to reach from the bracket to the bed or couch, must now be fastened through a hole at the extremity of each arm of the regulator. By pulling one side of the string the light is raised, by pulling the other it is lowered without going out. The apparatus may be readily attached, and it appears to be very well adapted for use by invalids, or by any one desirous of looking at his watch, or by persons suddenly roused from sleep by an unusual or sudden noise in the house.

#### An Electrical Tram-Car.

At Leytonstone a tramcar was recently propelled along the Union Road by the current from a Faure secondary battery carried under the seats of the car. An electric motor fixed under the bottom of the car was connected to the axles, and when driven by the current it turned the wheels of the car. The battery weighed one and a half tons, a considerable item in itself, but it contained sufficient electricity to run the car half a day, and the promoters anticipate being able to work the car on this plan at less cost than with horses.

#### The Electric Light and the Eyesight.

Remarking the large number of English students afflicted by shortness of sight, Professor Pickering has investigated the subject, and finds that the heat rather than the light of lamps and gas-burners is the cause of it. The heat radiated from the flame is reflected from the page into the student's face, drying the air about his eyes and temples. The electric light, giving off far less heat than gas or oil, is in Professor Pickering's opinion much better suited to the student in this respect. The flickering of the arc lamps is indeed a drawback; but it is the steady incandescent system which will be introduced into our homes, and there is absolutely no flickering with that. Moreover the globes surrounding the incandescent carbon can be tinted with a refreshing green or delicate blue for those who suffer from weak eyes.

#### Short-hand Reporting Superseded.

To Herr A. Gentili, of Vienna, the world is indebted for a new instrument which, if it fulfil the purpose designed for it by its inventor, seems likely to cause a revolution in the art of reporting. It is known as the "Glossograph," and consists of an arrangement of delicately formed levers and blades, which, when the instrument is laid upon the lips and tongue and beneath the nostrils of the speaker, are vibrated by the movements of the former and the breath proceeding from the latter. In connection with the instrument are pencils, which are directly acted upon by means of the vibrations being communicated to them; and these indicate upon a strip of paper, moved by an ingenious mechanical arrangement, various signs caused by the action of the tongue and lips and the breath from the nostrils. The signs produced on the paper are those belonging to a system of writing (similar to short-hand) used specially for the purposes of the glossograph; and, owing to these signs being phonetic, the instrument seems to be most successful in its operations when taking down words the spelling of which differs least from its own record of them. It is stated that by means of the glossograph it will be possible to write four or five times as quickly as short-hand has hitherto enabled us to write; and the instrument is not only self-acting, but there is no necessity, when making use of it, for any preliminary study or practice. The signs recorded on the slip of paper are capable of being easily transcribed, and the use of the apparatus does not occasion either inconvenience or fatigue to the speaker. It is not necessary that the glossograph should be used by the individual whose words are being reported; a second person can operate with it by repeating in a low tone the spoken words, which will be sufficient to cause them to be recorded on the slip of paper.

## NEW PRIZE COMPETITIONS.

### SPECIAL NOTICE.

*Further Competitions for Prizes, open to all Readers of this Magazine, will be announced in our next issue.—THE EDITOR.*